



Environmental Impact Analysis Process



**ENVIRONMENTAL ASSESSMENT
ADDITIONS TO AND OPERATIONS OF
AEROSPACE DATA FACILITY**

**Buckley Air National Guard Base, Colorado
November 1992**

DEPARTMENT OF THE AIR FORCE

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE AND MISSILE SYSTEMS CENTER (AFMC)
LOS ANGELES, CA

10 NOV 1992

TO: Governmental Agencies, Public Officials, Public Groups and Interested Individuals

Attached for public and governmental agency notification is the Finding of No Significant Impact (FONSI) and the Environmental Assessment (EA) for the Additions to and Operations of the Aerospace Data Facility located at the Buckley Air National Guard Base, Colorado. This is in compliance with the National Environmental Policy Act of 1969 and the regulations of the President's Council on Environmental Quality.

The FONSI and EA address the environmental impacts associated with the additions and operations of the Aerospace Data Facility located at the Buckley Air National Guard in Aurora, Colorado. The thirty (30) day notification period is not required based on the standards set in Air Force Regulation 19-2, Environmental Impact Analysis Process, paragraph 11f (1-4).

Copies of the FONSI and EA may be obtained by writing to:

Department of the Air Force
Headquarters Space and Missile Systems Center
SMC/CEV
Attn: Mr. Dan Pilson
P.O. Box 92960
Los Angeles AFB, CA 90009-2960

or by calling Mr. Dan Pilson at (310) 363-1409.

Sincerely,


WILLIAM G. NORTON, COL, USAF

FINDING OF NO SIGNIFICANT IMPACT

ADDITIONS TO AND OPERATIONS OF AEROSPACE DATA FACILITY BUCKLEY AIR NATIONAL GUARD BASE AURORA, COLORADO

1. PROPOSED ACTION

The United States Air Force (USAF) operates the Aerospace Data Facility (ADF) at Buckley Air National Guard Base (ANGB), located in Aurora, Colorado. USAF proposes to modify the ADF to provide additional secure, permanent office and computer operations space. Modification is needed to provide response capability to USAF directives requiring the expansion of ADF's mission and to provide permanent work space for staff currently located in temporary trailers.

ADF is a space tracking and data processing center completely contained within the perimeter fence of Buckley ANGB and located approximately 12 miles east of Denver, Colorado. Main features of the ADF include an operations building (Building 401), radomes housing receiving antennae, a chiller plant, a power plant housing emergency power diesel generators, temporary office trailers, warehouses and other storage facilities, and a recreation complex.

USAF is proposing to add approximately 150,000 square feet to Building 401. This expansion would provide permanent office space for approximately 500 employees, currently located in trailers adjacent to Building 401, and additional computer operations space. Utility modifications proposed to support the addition include adding two 2,500-kilowatt emergency generators to the existing power plant; two 1,000-ton-capacity chillers to the existing chiller plant; tree cooling tower cells adjacent to existing cooling towers; and miscellaneous additions and modifications to integrate additions with existing facilities. Construction, scheduled to begin in late spring 1993, would last approximately 18 months. Cost for the Proposed Action has been estimated at \$40,000,000.

Alternatives to the Proposed Action that were analyzed were No Action and sitting elsewhere within the ADF complex, outside of the ADF complex but inside of Buckley ANGB, and outside of Buckley ANGB. The No-Action alternative would eliminate environmental impacts but would adversely affect national security since the ADF would not have computer space needed to meet

expanding mission requirements. The sitting alternatives were found to result in operational deficiencies, primarily due to the need for additional construction to duplicate existing ADF support facilities. The additional construction would also result in environmental impacts at least as great as, or greater than, those associated with the Proposed Action.

2. SUMMARY OF ENVIRONMENTAL IMPACTS

Socioeconomic Resources – Construction activities are expected to cause minor impacts to local transportation resources because the activities would be temporary (18 months) and because the increase (worst-case peak estimate of 400 vehicles per day) would be a small percentage increase in a community population of more than 200,000. Operations would result in little permanent change because the existing staff level (1,300) would remain the same.

Utilities – The peak construction workforce may account for a temporary, localized increase in domestic water consumption of approximately 20,000 gallons per day (gpd), with a proportionate increase in wastewater generation rates. Existing operations impacts (approximately 65,000 gpd consumption and wastewater) are expected to remain approximately the same because staffing levels would remain unchanged. The estimated maximum operations electrical demand, based on maximum capacity, would be 6 megawatts, approximately doubling current demand but being less than 1 percent of system reserve capacity. The commercial power source (Public Service Company of Colorado) has determined that the project would not necessitate upgrading its lines or substation. Four additional hot water and steam units would increase ADF natural gas demand by 20 percent, which is less than 1% of system capacity and is expected to be a negligible impact.

Cultural Resources – The absence of important cultural resources in the project area was determined in consultation with the Office of Archaeological and Historic Preservation of the Colorado Historical Society.

Noise – Calculated existing emergency power diesel generator noise emissions at the site boundary [48 A-weighted decibels (dBA)] are expected to increase by 1 dBA under the Proposed Action. The cumulative impact would be approximately the same as that of typical daytime suburban noise levels.

Air Resources – Uncontrolled construction-phase fugitive particulate emissions are estimated to total 2.4 tons per month. These emissions would be reduced by as much as 50 percent, however, by use of control measures such as wetting and placing covers over soil in transport trucks, and are

not expected to be significant. Estimated operations emissions would increase existing emissions by approximately 25 percent but, because these amounts are small, the cumulative impact is expected to be minor.

Surface Water Resources – Due to the small area of disturbance, the relatively flat topography, and the distance to the nearest natural waterway, construction-related impacts to surface water resources are expected to be minimal and would be mitigated by use of best management practices (BMPs) and implementation of the Buckley ANGB Spill Prevention, Control, and Countermeasure (SPCC) Plan. Because operations would be staffed with existing personnel, operations impacts are not expected to change.

Geology, Soils, and Groundwater – Routine construction and operation activities are not expected to impact these resources. Impacts from spills and other inadvertent activities would be minimized by use of BMPs and the SPCC Plan.

Biological Resources – Impacts are expected to be limited to loss of fewer than 5 acres of marginal small mammal and reptile habitat and, possibly, some minor losses of small mammals and reptiles rendered more vulnerable to predation as a result of displacement. As a result of informal consultation undertaken in accordance with Section 7 of the Endangered Species Act, the U.S. Fish and Wildlife Service Colorado Field Office has determined that the Proposed Action is not likely to impact any Federally-listed species or jeopardize the continued existence of threatened or endangered species' critical habitat.

Floodplains and Wetlands – The Proposed Action is not located in a floodplain or wetland, and impacts to the nearest of these resources are not expected due to the project's small size and its distance from these resources (2,600 feet).

Visual Resources – The existing facility is a visually important element in the landscape due to the four 110-foot-high radomes which contrast with the predominately commercial and residential context. The proposed addition is not expected to increase visual impacts since its low profile (one-story), color, and surface would be similar to existing structures.


Waste Management – Construction impacts are expected to be limited primarily to generation of excess excavated soil, which will be transported to the Buckley ANGB Overburden Stockpile because it is suitable for use as fill material for other Buckley ANGB projects. Operations impacts are expected to be minimal because the addition would be staffed by existing personnel.

3. FINDINGS

Based upon the above discussion and the supporting Environmental Assessment, a Finding of No Significant Impact is made. Copies of the Environmental Assessment of the Proposed Action, dated November 1992, can be obtained from the following:

Department of the Air Force
Headquarters, Air Force Material Command, SMC/CEV
Post Office Box 92960
Los Angeles AFB, CA 90009-2960
Attn: Mr. Daniel Pilson

APPROVED: HQ SMC Environmental Protection Committee



EUGENE L. TATTINI
Brigadier General, USAF
Vice Commander

ENVIRONMENTAL ASSESSMENT

ADDITIONS TO AND OPERATIONS OF

THE AEROSPACE DATA FACILITY

Department of the Air Force
Air Force Materiel Command
Space and Missile Systems Center
Directorate of Acquisition Civil Engineering
Environmental Planning Division

November 1992

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1.0 PROPOSED ACTION AND ALTERNATIVES

The United States Air Force (USAF) constructed and operates the Aerospace Data Facility (ADF) and ancillary structures at Buckley Air National Guard Base (ANGB) located in Aurora, Colorado (Figure 1-1). USAF proposes to expand and operate an existing office and computer facility. To support this facility, USAF also proposes to add to existing utilities to provide additional emergency power, chiller, and miscellaneous support infrastructure capacity. This Environmental Assessment (EA) addresses the potential environmental impacts from this and alternative actions.

ADF is a USAF space tracking and data processing center (approximately 90 acres in size) completely contained within the perimeter fence of Buckley ANGB (Figure 1-2). Buckley ANGB is located at latitude 39 degrees 42 minutes north and longitude 104 degrees 45 minutes west. The ADF complex (Figure 1-3) consists of operations buildings, radome structures (which house receiving antennae), and support facilities. Table 1-1 summarizes the functions performed by major ADF buildings.

1.1 PROPOSED ACTION

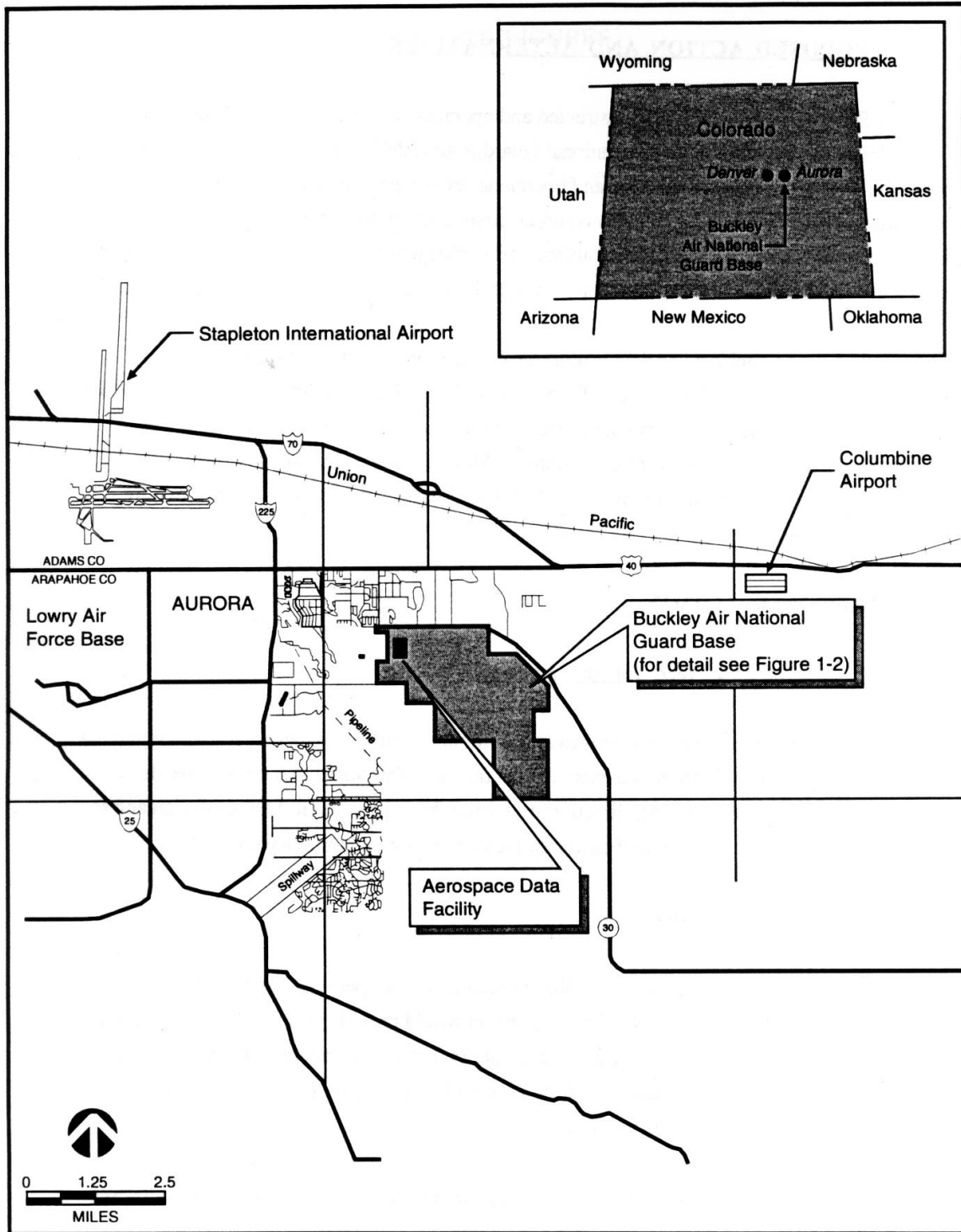
1.1.1 Purpose of and Need for the Action

The purpose of the Proposed Action is to provide additional secure permanent office and computer operations space located adjacent to the existing data facility. The additional space is needed to provide response capability to USAF directives requiring the expansion of ADF's mission and to provide permanent work space for staff currently located on-site in temporary trailers.

1.1.2 Project Description

USAF is proposing to add approximately 150,000 square feet of operations and support space to the existing Building 401 (Figure 1-4). This expansion would provide permanent office space for approximately 500 employees currently located on-site in temporary trailers and would provide additional computer operations space. The following utility modifications (Figure 1-5) are proposed to support the Building 401 addition:

- Two 2,500-kilowatt (kW) emergency diesel generators to be added to the existing power plant



Source: Modified from Higginbotham 1988.

Figure 1-1. Location of the Aerospace Data Facility

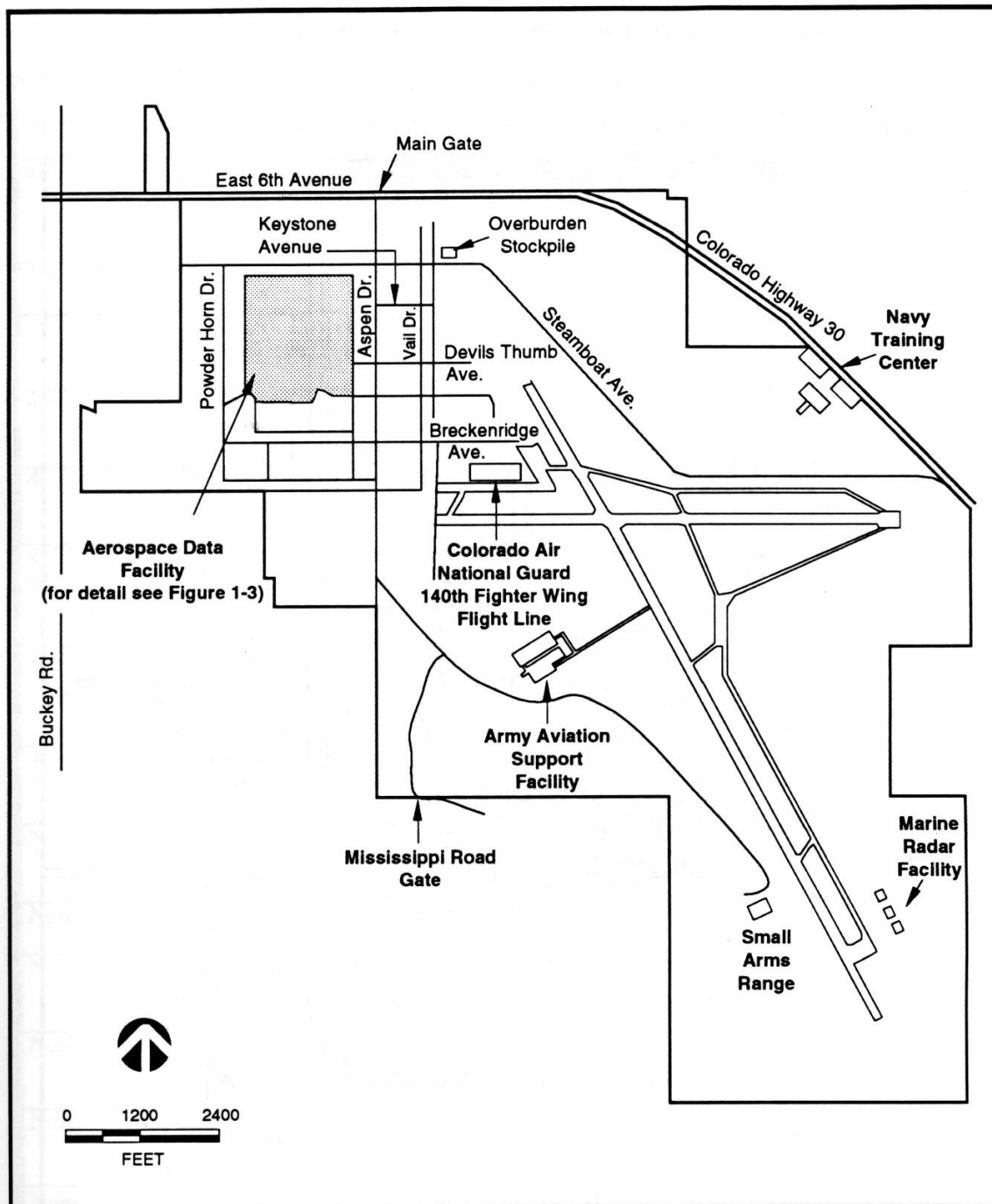
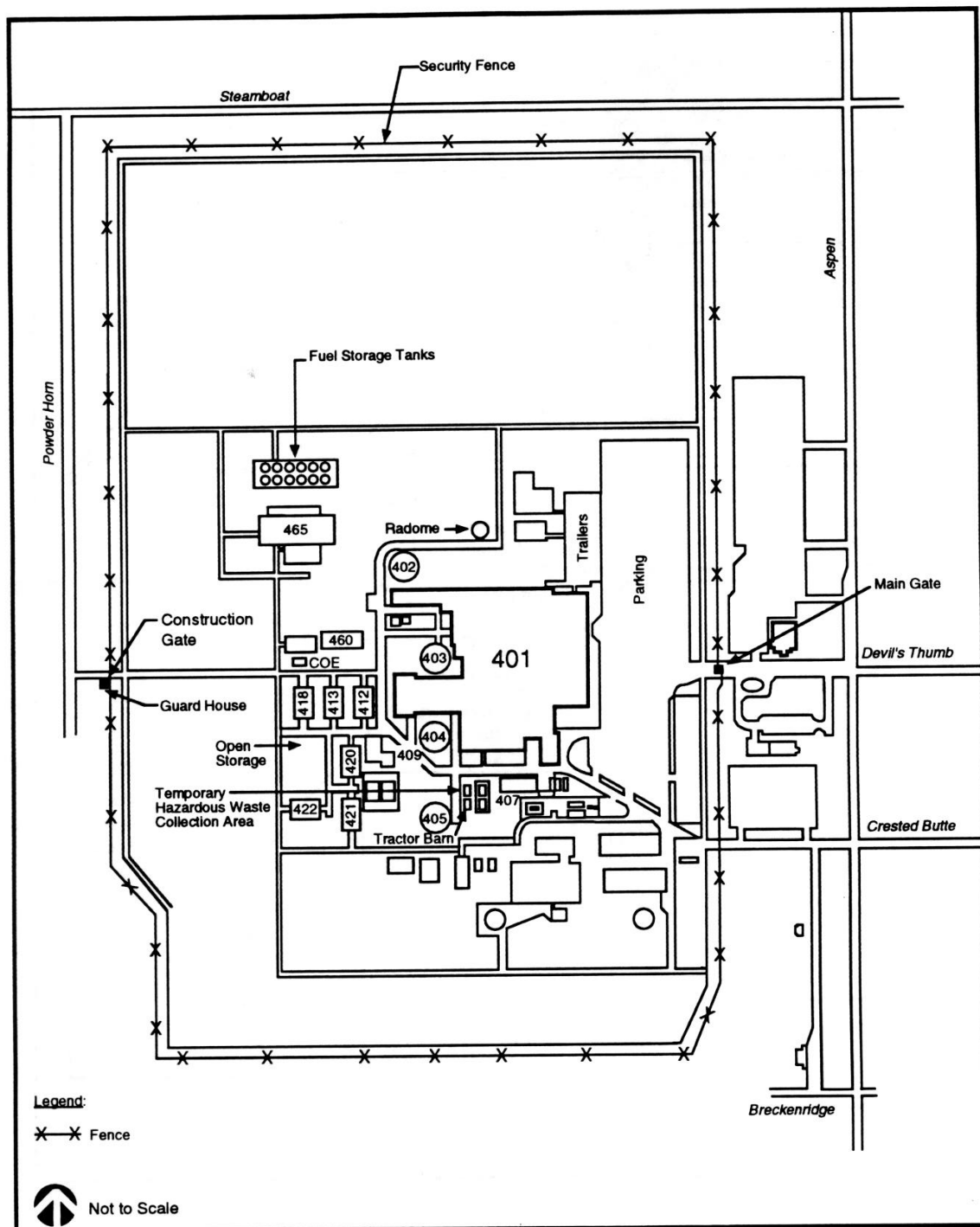


Figure 1-2. Main Features of Buckley Air National Guard Base

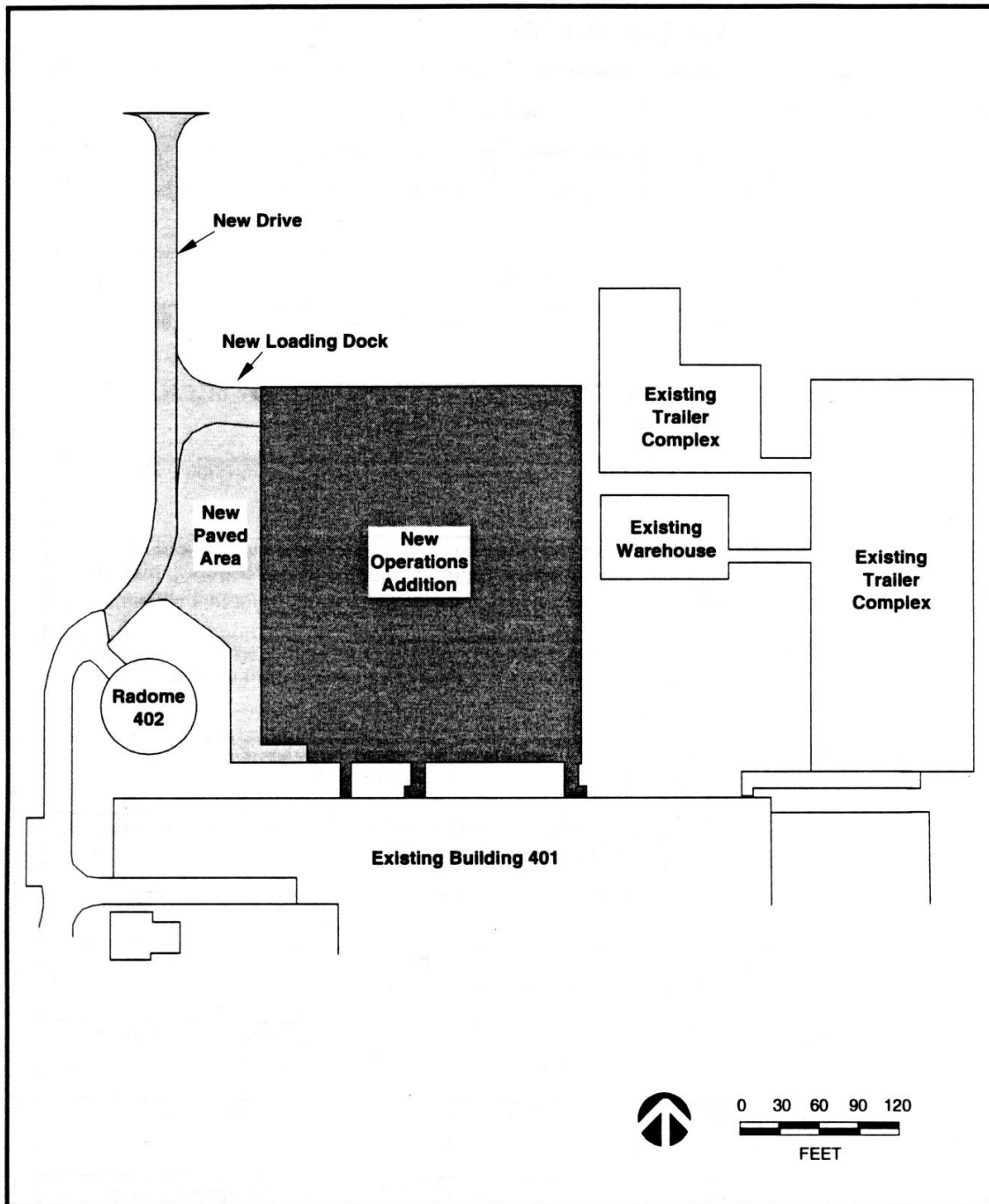


Source: Modified from Mullans 1992.

Figure 1-3. Aerospace Data Facility Site Plan

Table 1-1. Aerospace Data Facility Building Descriptions

Building No.	Facility Description
401	Operations Building - Single-story, 350,000-sq. ft. (with partial basement) building housing offices, computer equipment, and mechanical and electrical service areas
402-405	Radomes - Geodesic domes that house receiving antennae
407	South Power Plant - Metal shed building containing five diesel generators no longer in use
408	Paint Storage Area - Concrete block structure for storage of paints and solvents with external fenced yard for storage
409	Recreation Complex - Racquetball courts, weight room, locker rooms, and outdoor tennis courts
412, 413, 418, 420, 421, 422	Warehouse - Metal shed building for storage of new materials and supplies, computers supplies and hardware, building maintenance products, janitorial supplies, building hardware and materials, and water treatment chemicals
460	Chiller Plant - Plant that houses four 1,000-ton-capacity chillers, connected to two three-cell cooling towers, for temperature regulation of other ADF buildings
465	Central Power Plant - Plant that houses six 2,500-kW emergency generators powered by six Caterpillar diesel engines
None	Diesel Fuel Storage Area - Area with twelve 16,800-gallon aboveground tanks refilled by pipeline from Buckley ANGB central storage
None	Trailers - Temporary offices
None	Open Storage Area - Fenced, clear area used to store miscellaneous construction materials and equipment
None	Tractor Barn - Metal shed building for storage of ground-maintenance equipment, painting supplies, adhesives, and hand and power tools
None	Temporary Hazardous Waste Collection Area - Paved area for storage of potentially hazardous wastes
None	U.S. Army Corps of Engineers (COE) Office - Temporary office trailer used while supervising construction activities



Source: Modified from Black & Veatch 1992.

Figure 1-4. Proposed New Operations Addition to Building 401

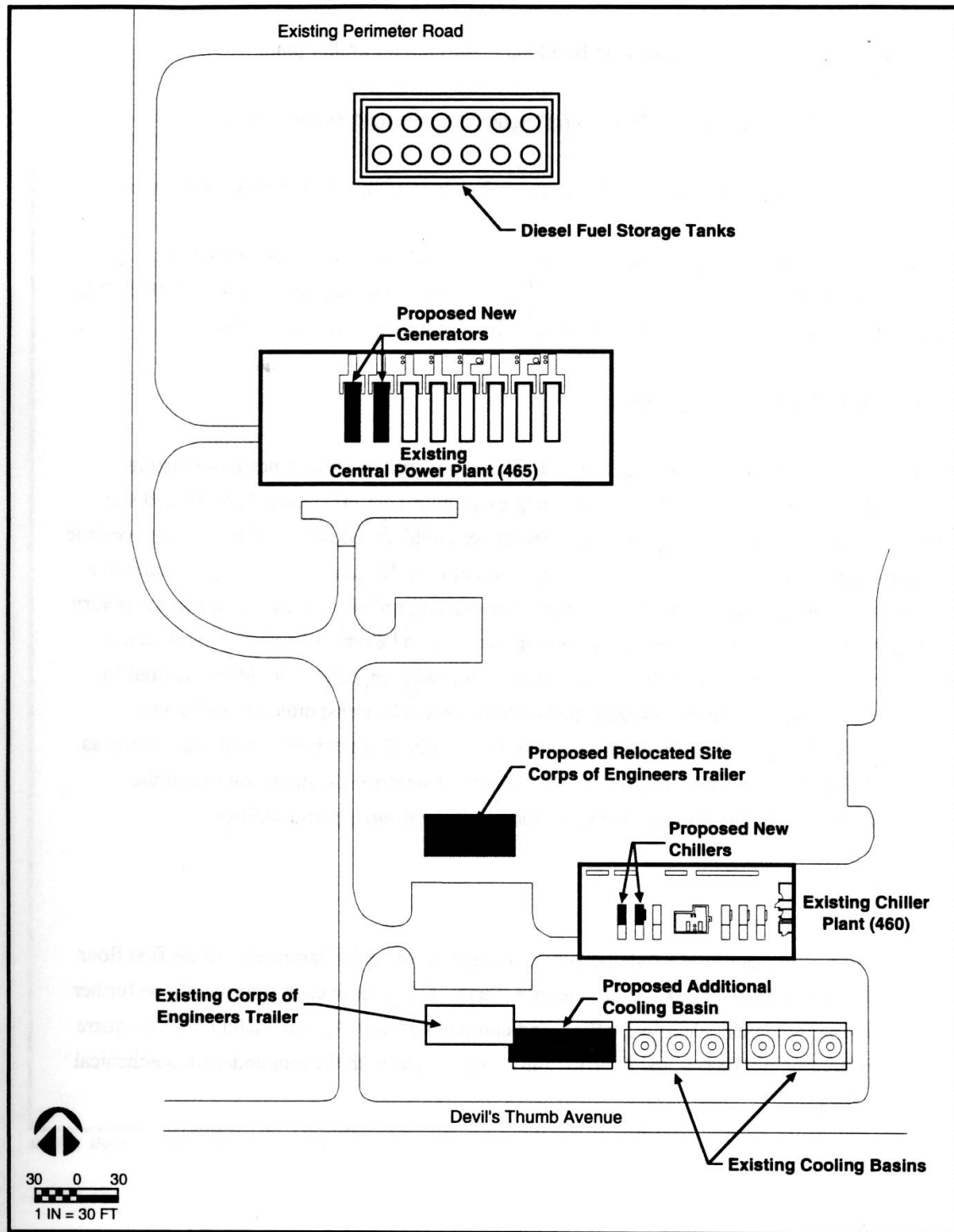


Figure 1-5. Site Plan Showing Existing Utilities and Proposed Modifications

- Two 1,000-ton-capacity chillers to be added to the existing chiller plant
- Three cooling tower cells to be constructed next to existing cooling towers
- Miscellaneous additions and modifications to integrate additions with existing facilities

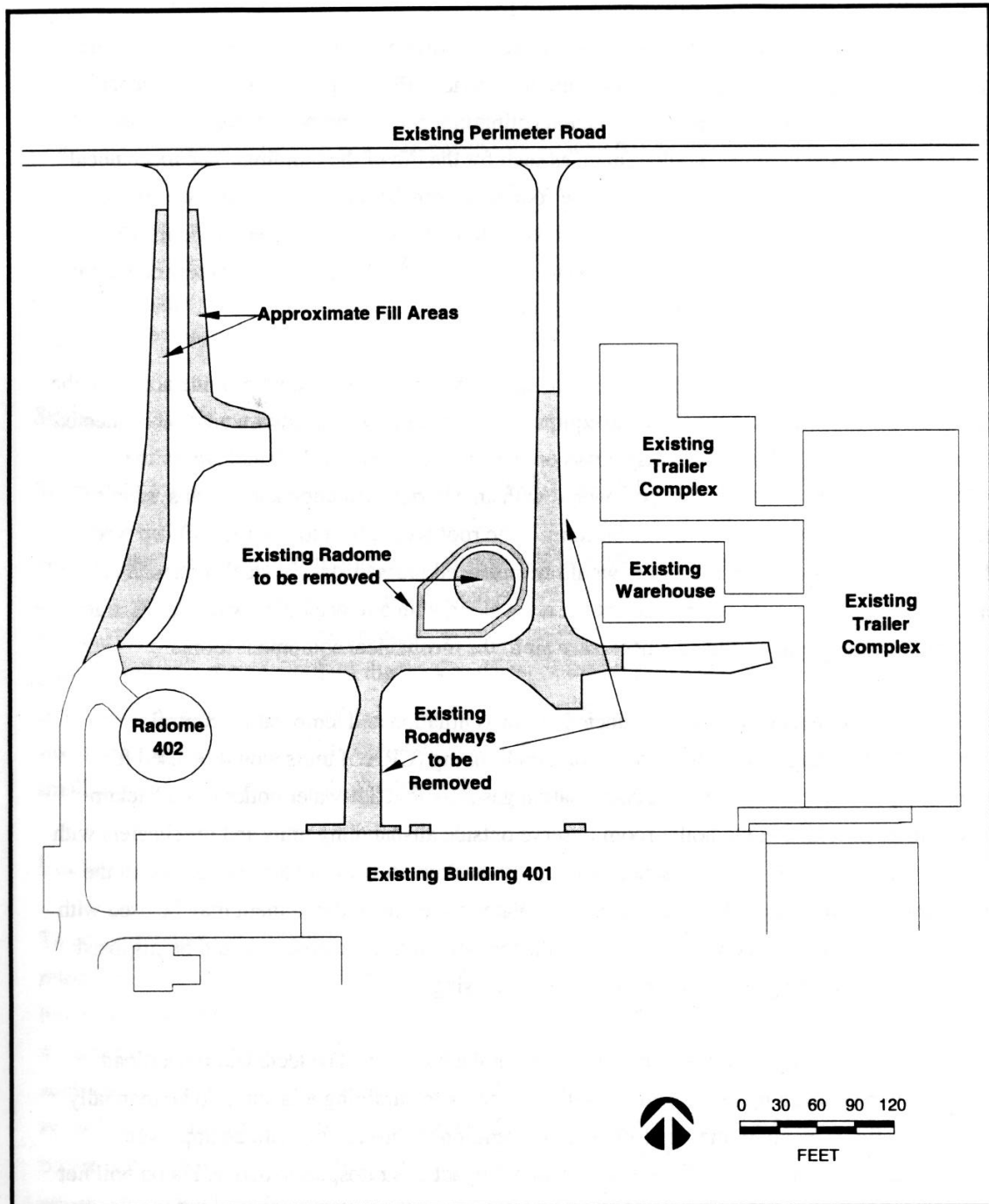
Construction, scheduled to begin in approximately the second quarter of 1993, would last approximately 18 months. Cost for the Proposed Action has been estimated at \$40,000,000. It is estimated that construction would involve a peak labor force of approximately 400.

1.1.2.1 Building 401 Expansion

The proposed 150,000-square-foot Building 401 addition would be located north of existing Building 401 and west of the existing trailer complex (Figure 1-4). The sparsely vegetated site slopes generally to the north and west. Site preparation would include removal of existing concrete and bituminous pavements, fencing, and underground utilities (Figure 1-6). The foundation of a small inflatable radome would also be removed. The existing trailers that are serving as temporary office space, located east of the proposed addition, would also be removed after construction is complete. Grubbing, excavation, backfill, embankment, and compaction would be required for site preparation. Most of the excess excavated material would be transported to the Buckley ANGB Overburden Stockpile (Figure 1-2), where such material is retained for subsequent use as fill material elsewhere on base. The following subsections describe the main features of the Proposed Action, including building addition, access, storm drainage, and utilities.

Building Addition

The proposed building addition would be evenly divided between the basement and the first floor of the two-story structure (75,000 square feet per story). The area on each floor would be further divided among mechanical, electrical, office, and computer usage. Approximately 53,000 square feet on each floor would be devoted to office and computer use with the remainder for mechanical and electrical uses.



Source: Modified from Black & Veatch 1992.

Figure 1-6. Proposed Removal of Existing Features and Approximate Fill Areas

Initially, much of the proposed addition would be used for office and training space while future plans call for nearly complete conversion to computer space. Planning room, UPS, maintenance and equipment, laboratory (electronic-equipment calibration and prototype development), and computer tape storage facilities would remain as such for the life of the building. The mechanical and electrical spaces would include mechanical rooms on both floors that would house large air handlers and other heating, ventilating, and air conditioning (HVAC)-related equipment, two first-floor uninterruptible power supply (UPS) rooms, two first-floor electrical load center rooms, two basement battery rooms, and a sewage pump room.

A dock on the first floor, along with a freight elevator to the basement, would provide access to the building for the movement of supplies and equipment. The proposed addition would be connected to existing Building 401 by three passageways on the first floor (Figure 1-4) and two in the basement. The exterior walls would be covered with an exterior insulation and finish system to match that used on other portions of the building. The roof would be a low slope built-up type with interior roof drains. Exterior doors would be insulated pressed steel in steel frames. An overhead rolling door would be provided at the dock along with a relocated dock leveler. Large aluminum louvers would provide the necessary air to the mechanical equipment rooms.

The mechanical systems would provide ducted air for ventilation and temperature control throughout the building. Computer Room Air Conditioning (CRAC) units would be used for cooling computer operations areas. A combination gas-/oil-fired hot-water boiler (with backup unit) would be provided in the boiler room to serve outside air-handling units and unit heaters with hot water. A dual-fired (gas or oil) steam boiler (with backup unit) would also be located in the boiler room to provide steam for humidification. Water-softening and treatment may be used with condensate routed through convectors to lower the temperature. Condensate would be disposed through the central sewage system for municipal processing.

Both technical and utility power would be provided in the building. The technical power load centers would be backed up by UPS units, with battery rooms draining to a sump to be manually pumped. For fire protection, the building would be equipped throughout with an approved automatic wet sprinkler system. To reduce potential impact to stratospheric ozone, Halon will not be used in these systems. Detection and alarm systems, as well as other appropriate fire-protection features, would also be provided.

Access

A new bituminous-surfaced road would be provided for access to a dock near the northwest corner of the addition (Figure 1-4). A concrete-paved (due to load requirements) area would be provided at the dock for parking and access to trash compactor. Asphalt pavement would be provided to access the southwest corner of the building addition. Traffic in these areas is expected to be light, limited to security patrol vehicles and an occasional maintenance or delivery vehicle. Fences currently located to the west of the northwest trailers and secure storage building would be relocated to be flush with the west faces of these structures.

Storm Drainage

Storm drainage in the vicinity of the addition would be accomplished by a combination of surface flow, area inlets, and underground drain piping. An existing 10-inch drain releases storm water to grade on the north side of Building 401. This flow would be redirected to an underground pipe collector, which would be located on the south side of the proposed addition, with an area inlet in the confined space between the proposed addition and existing Building 401. The collector would discharge to a new ditch north of the dock and east of the proposed access road. This ditch would slope north parallel to the new road, draining to the existing ditch running west along the south side of Keystone Avenue. This new load would increase peak flow in this existing ditch by a very small amount (1.5 percent of ditch capacity).

Utilities

To accommodate the proposed construction, a number of existing utilities would need to be relocated. The existing 12-inch water, 4-inch gas, and 8-inch sanitary sewer lines that cross the building addition site would be re-routed north to a location near the access road. An existing 4-inch high-pressure gas line west of the addition would be re-routed further west. The existing sanitary sewer line which crosses the site would be re-routed from an existing manhole northeast of the trailer complex to an existing manhole approximately 900 feet northwest. Flow from the trailer complex will be tied to the new 10-inch line, northeast of the complex, until the trailers are vacated upon building completion.

Potable water and fire-protection water for the addition would be supplied from the 10-inch water line located west of the proposed addition. Existing water supply would be adequate to meet

projected demands. Gas service to the addition would be supplied via the existing chilled-water rack from an existing 4-inch gas line located west of the addition.

1.1.2.2 Power Plant and Chiller Plant Expansion

The following additional utilities will support the office expansion:

- The new diesel generators, with associated controls and peripheral equipment, to be located in the Central Power Plant (Figure 1-5). Because the generators will be used only to provide emergency power during loss of commercial power, emission mitigation measures are not required (see Section 4.1).
- Switchgear, bus duct, and relaying equipment required to install the generator bus tie.
- Two new chiller, with associated piping and controls, to be located in the Central Chiller Plant (Figure 1-5).
- Three new cooling tower cells on a new basin, with associated piping and controls, to be added the existing Central Chiller Plant cooling towers (Figure 1-5).

Power Plant

Two new 2,500-kW diesel engine-driven skid-mounted generators (Caterpillar Model 3612) would be installed in the Central Power Plant (Figure 1-5) along the associated controls and peripheral equipment, including radiators, exhaust silencer, and intake stacks on the exterior of the building, and new controls and control panels in the interior. No major structural construction is required since concrete foundation blocks are present in the Central Power Plant to receive the proposed and two additional generators.

The generators would be fueled using No. 2 diesel fuel supplied from the existing aboveground storage tanks (Figure 1-5) and day tanks. The new generators would be supplied with fuel by extending the fuel-oil supply and return headers inside the plant. The exhaust piping inside the power plant would be insulated and lagged to reduce noise. The exhaust piping and silencers outside the power plant would be painted or coated. The generators would be used to supply emergency electrical power in case of commercial power failure.

Chiller Plant

The new 1,000-ton chillers equal in size, make, and type to the four existing chillers (Trane Model CVHE 1120), along with all associated piping and controls, would be added to the existing Chiller Plant (Figure 1-5). No major structural construction is required since concrete foundation blocks are present to receive the proposed and two additional chillers. Three new cooling towers to equal size, make, and type as the six existing cooling towers (Marley Model 222-261) would also be added southwest of and adjacent to the plant along with associated piping and controls (Figure 1-5).

The new chillers would operate with a hydrochloroflourocarbon-123 formulation (HCFC-123) refrigerant. HCFC-123 is a Clean Air Act Class II substance, which means that it is preferred as more protective of stratospheric ozone than Class I substances (which are being phased out of use by the end of 1999). Using the new refrigerant, each new chiller would be able to generate 1,000 tons of chilled water with an increase of approximately 11 percent in electrical energy consumption compared to existing units which use a chlorofluorocarbon-11 formulation (CFC-11) refrigerant. The cooling towers would be supported on reinforced concrete walls sitting on a concrete slab-on-grade foundation. Storm drainage would be accommodated by regarding and creating an earth berm around the basin.

Site preparation would include relocation of the U.S. Army Corps of Engineers (COE) trailer to the north of its current location (Figure 1-5). A concrete sidewalk would be constructed for access to the building.

1.2 ALTERNATIVES

1.2.1 Alternative Siting

The range of alternatives discussed in this section is primarily driven by the feasibility of supplying the required additional operations space and providing permanent work space for staff currently located in temporary trailers. Operations and support space could be adequately provided in a stand-alone facility of the approximate size and configuration of the proposed addition to Building 401. Utilities and other support equipment to link this facility into Building 401 would be configured appropriately to support the alternative location.

1.2.1.1 Within ADF

As part of the site-selection process, undeveloped areas within the ADF, in addition to the proposed site, were considered as potential locations for the proposed expansion. The proposed expansion could be accommodated to the east of Building 401 (Figure 1-3) in what is currently the parking area. Other areas of the ADF adjacent to Building 401 are too densely developed to accommodate the proposed expansion. It is apparent that the potential for environmental impacts from development of the proposed expansion in the parking area would be greater than the Proposed Action because of the following:

- Additional parking space would need to be constructed to offset lost capacity.
- Additional waste would be generated due to removal of the parking area surface.

1.2.1.2 Within Buckley ANGB

Development of the proposed capabilities could be accommodated outside of the existing ADF compound, but within Buckley ANGB. Suitable areas include lands designated as administrative and industrial support located in the Buckley ANGB central area (generally between Aspen and Vail Drives on the east and west and Keystone and Breckenridge Avenues on the north and south) (Higginbotham 1988). Compared to the Proposed Action, locating the additional operations space outside of the ADF would require additional construction, including the following:

- Security fencing and ingress/egress control
- Vehicular access including parking and roads
- Secure utilities for data relay
- Power and chiller buildings

It is apparent that, due to the similarity of site conditions and the more extensive development required for siting the facility outside of the ADF, environmental impacts would be greater than those described for the Proposed Action.

1.2.1.3 Outside of Buckley ANGB

Development of the proposed capabilities could be accommodated outside of Buckley ANGB. Suitable areas include lands owned by the Federal Government within the immediate Denver metropolitan area such as Lowry Air Force Base (Aurora, Colorado). Selection of a remote site such as this does not effectively support mission requirements due to the desirability of short data line lengths. In addition, it is important to mission success that all equipment reside at a single location to limit access traffic for security purposes and to promote integration. Finally, this alternative would necessitate relocating existing ADF staff. For these reasons, it has been determined that this alternative would not be operationally acceptable. Furthermore, because this alternative would require additional construction as that described in Section 1.2.1.2, this alternative would also have environmental impacts greater than those described for the Proposed Action.

1.2.2 No Action

The No Action alternative would mean that the proposed addition to Building 401 and utility expansion would not occur and that the current facility utilization would continue. Adopting the No Action alternative would adversely impact national security since the ADF would not have computer space needed to meet expanding mission requirements. Environmental impacts associated with the Proposed Action would not occur if the No Action alternative were adopted.

1.3 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

This EA was prepared to satisfy the environmental review requirements set forth in the National Environmental Policy Act of 1969 (NEPA, 42 USC 4321-4347). It was prepared in accordance with the President's Council on Environmental Quality regulations implementing the National Environmental Policy Act (NEPA), Title 40, Code of Federal Regulations, Parts 1500-1508 (40 CFR 1500-1508) and Air Force Regulation (AFR) 19-2. The objective of the EA is to provide the basis for a determination of the significance of environmental impacts of the Proposed Action.

To determine potential cumulative impacts, the effects of construction and operations of the Proposed Action are considered in addition to the impacts resulting from the operations of the facility as it is currently configured. This approach is consistent with the requirements of the regulations cited above and provides the upper bound of potential impacts from the facility as a whole.

2.0 AFFECTIVE ENVIRONMENT

2.1 EXISTING FACILITY

This chapter provides background information on existing Buckley ANGB and ADF facilities and potentially affected environmental resources. Material contained in this chapter, along with the description of the Proposed Action (Chapter 1.0), provides the baseline from which potential impacts are determined (Chapter 3.0). Information on existing facilities is provided in some detail so that existing effects may be cumulatively added to potential effects from proposed facilities.

2.1.1 Buckley ANGB

Buckley ANGB is located in a metropolitan setting approximately 12 miles east of Denver, Colorado (Figure 1-1). The Base is within the City of Aurora and is bounded to the west, north, and south by Aurora and the east by unincorporated Arapaho County. The site was commissioned in 1942 as an armed services training field and currently has four distinct missions, which follow:

- Provide combat readiness training for the Colorado Air National Guard (COANG).
- Operate and maintain the only operational military airfield in the Denver metropolitan area, supporting more than 60 permanently assigned aircraft and providing services to more than 10,000 transient military aircraft per year.
- Provide aircraft search, rescue, and crash response within the area half the distance between the Base and the Cities of Cheyenne, Wyoming; Salt Lake City, Utah; Colorado Springs, Colorado; and Wichita, Kansas.
- Provide host support to tenant organizations.

The host unit at Buckley ANGB is the 140th Fighter Wing, COANG. This unit operates and maintains the installation, providing support to active and reserve tenant units of all services. Tenant units include other units of the Colorado National Guard, the Colorado Civil Air Patrol, and units of the USAF and the United States Navy/Marine Corps. ADF is one such tenant.

Buckley ANGB occupies approximately 3,250 acres, nearly half of which is developed and half of which serves as a buffer area and provides room for additional growth (Figure 1-2). Base land uses include airfield, aircraft operations and maintenance, industrial support, administrative support, community services, outdoor recreation, and open space. These land uses are described in more detail in Table 2-1.

Construction projects are routinely undertaken to upgrade existing facilities and to provide new capacity. Approximately 15 Buckley ANGB projects are proposed for construction during the proposed ADF construction period (Spring 1993 through Fall 1994). These projects range from roof repairs to aircraft hanger renovation and office building construction.

2.1.2 ADF

ADF is a USAF space tracking and data processing center (approximately 90 acres in size), completely contained within the perimeter fence of Buckley ANGB (Figure 1-2). Bounded by Steamboat Avenue, Aspen Drive, Breckenridge, and Powder Horn Drive, as shown on Figure 1-3, ADF is located at latitude 39 degrees 42 minutes north and longitude 104 degrees 45 minutes west. During World War II, Buckley ANGB was an armed forces training center; and the present ADF site was a barracks area (Section 2.4).

The ADF was originally constructed in 1969 and has expanded several times in response to mission demands. The ADF main complex (Figure 1-3) consists of an operations building and temporary trailers; radome structures (antenna housing); two power plants (the South Power Plant is no longer active); aboveground and underground diesel-fuel storage tanks; and a chiller plant and cooling towers for building air conditioning, parking lots, and various buried electric communication, gas water supply, and wastewater utility lines. Table 1-1 identifies ADF buildings and describes their functions. ADF currently employs approximately 1,300 people.

The proposed project site is adjacent to the north side of the ADF operations building, west of a temporary trailer office complex (Figure 1-4). The site, which has been disturbed several times, is occupied by a small radome, a bituminous road, a concrete drainage ditch, and sparse vegetation. Underground utilities traverse the area; and non-historic remnants of World War II era and other, more recent foundations may be present. The following sections provide additional detail about the ADF and its environment that may be affected by the Proposed Action.

Table 2-1. Buckley ANGB Land Use

DESIGNATION	USE AND SIZE^a
Airfield	Runway, taxiways, aprons, and clearances and setbacks from these pavements (1,400 acres, or 43 percent of total area)
Aircraft Operations	Direct support to flying mission (e.g., hangers, powercheck pad, control tower/crash fire station, simulator training, aircrew support, munitions and fuel storage, and engine testing) (50 acres, or 2 percent of total area)
Industrial Support	Activities essential for installation operation (e.g., civil engineering, transportation, supply, and utilities) (140 acres, or 4 percent of total area)
Administrative Support	Headquarters, administrative, and security offices (40 acres, or 1 percent of total area)
Community Services	Medical, dining, and indoor recreational facilities (15 acres, or less than 1 percent of total area)
Outdoor Recreation	Athletic fields, picnic areas, skeet range, and land adjacent to reservoir (40 acres, or 1 percent of total area)
Open Space	Training area and visual and noise barrier (1,400 acres, or 40 percent of total area)
Water	8-acre reservoir (less than 1 percent of total area)
Special Use	Miscellaneous uses and large, tenant-occupied facilities (e.g., ADF) (185 acres, or 6 percent of total area)

^a Totals are rounded, and percentages may not total 100 percent.

Source: Higginbotham 1988.

2.2 SOCIOECONOMIC RESOURCES

2.2.1 Population

Aurora's population has increased at an annual rate of approximately 5.7 percent, for 74,000 persons in 1970 (Stearns 1987) to 222,103 persons in 1990 (Bureau of the Census 1992). A population analysis conducted by the City of Aurora Planning Division projected the major thrust of residential growth for the Aurora area, through 1997, to be centered in southeast Aurora. Residential growth in the northeast is expected to be limited because most of the land currently zoned as residential lies within the Buckley ANGB accident potential zone (Stearns 1987).

2.2.2 Employment

As shown in Table 2-2, civilian employment in Aurora in 1990 was 119,026, with an unemployment rate of approximately 4.9 percent. Military employment in Aurora was 4,798 for 1990. The three largest industrial employers in Aurora are (1) retail trade; (2) transportation; and (3) finance, insurance, and real estate (approximately 37 percent of the workforce is employed in these industries) (Table 2-3). Table 2-3 shows additional data regarding major Aurora civilian employment sectors and the numbers of persons they employed in 1990.

Table 2-2. Aurora, Colorado, Labor Market Data, 1990^a

Category	Persons
<u>Labor Force Participation</u>	
Not in Labor Force	37,045
Civilian	125,142
Military	<u>4,798</u>
Total	166,985
<u>Civilian Employment</u>	
Employed	119,026
Unemployed	<u>6,116</u>
Total	125,142

^aIncludes both civilian and military personnel.
Source: Bureau of the Census 1992.

2.2.3 Infrastructure and Services

The Aurora City Council has adopted a comprehensive plan so that city departments have had and will continue to have the guidance necessary to plan and provide infrastructure and services. Both capital facilities planning and fiscal impact analysis have allowed Aurora to plan and provide for adequate public services and facilities including water, sewer, street maintenance, and fire and police services.

Current City of Aurora policy is to enable annexation to the east and south. Each annexation is judged on its own merits, and the approval of development proposals is based on the availability of adequate public services. Given the past record of comprehensive planning, public services in Aurora can be expected to be available for future development support.

Table 2-3. Major Employment Sectors in Aurora, 1990^a

Industry	Number of Employees
Retail Trade	20,384
Transportation	10,694
Finance, Insurance, and Real Estate	12,897
Health Services	9,306
Business and Repair Services	8,200
Wholesale Trade	6,569
Public Administration	7,187
Educational Services	7,074
Manufacturing, Durable Goods	6,505
Other Professional and Related Services	8,324
Other	21,886
Total	119,026

^aThese data do not include military personnel.
Source: Bureau of the Census 1992.

2.2.4 Housing

The total number of housing units in Aurora has grown at an average annual rate of 2.7 percent from 84,817 in 1984 (Stearns 1987) to 99,893 units in 1990 (Bureau of the Census 1992). Tables 2-4 through 2-6 summarize Aurora 1990 housing characteristics.

2.2.5 Traffic

Aurora has experienced the traffic difficulties associated with a rapidly-expanding urban community. Disjointed transportation networks have resulted from localized development patterns. Public transportation services have not kept pace with residential and industrial growth. Some networks have suffered deterioration due to rapidly increasing traffic volumes.

The city's coordinated transportation planning and implementation programs include both short- and long-term solutions to these problems, such as improvements of major east-west routes, widening of Interstate 225, a new east-west crossing of Cherry Creek Reservoir, and regional light rail planning. In addition, the city will continue to serve localized transportation facilities such as bike paths, access control, street improvements, bus service, and traffic safety.

2.3 UTILITIES

2.3.1 Electrical Power

The Public Service Company of Colorado (PSCo) supplies electrical power to the Denver metropolitan area and has a net system capacity of approximately 4,400 megawatts (MW) and a reserve capacity of 18.6 percent (Stuntz 1992). The PSCo "East" substation, located at Colfax Avenue and Interstate 225, provides electrical power to Buckley ANGB through 13.2-kilovolt (kV) overhead distribution lines. Six lines serve various areas of Buckley ANGB, which is the largest user of power from this substation (Higginbotham 1988). The ADF is served by a 13.2-kV line, and ADF electrical demand is approximately 6MW (Hester 1992a).

The ADF main serves two transformers at the Central Power Plant (Building 465), where distribution is monitored at a control panel. The control panel also monitors two additional sources of ADF electrical power, the UPS and the Central Power Plant emergency power generators. Critical ADF equipment relies on the UPS, a system of batteries, and support hardware. In the

Table 2-4. Age of Aurora Housing

Year Structure Built	Number in Aurora
1989-March 1990	380
1985-1988	10,127
1980-1984	27,721
1970-1979	37,591
1960-1969	11,342
1950-1959	9,562
1940-1949	2,284
Prior to 1940	886

Source: Bureau of the Census 1992

Table 2-5. Types of Aurora Housing

Units in Structure	Number in Aurora
1 unit, detached	48,611
1 unit, detached	11,631
2-4 units	3,934
5-9 units	6,768
10 or more	28,929
Mobile home or other	3,017

Source: Bureau of the Census 1992.

Table 2-6. Value of Aurora Housing

Value	Number in Aurora
Less than \$50,000	3,416
\$50,000 to \$99,999	31,818
\$100,000 to \$149,999	7,164
\$150,000 to \$199,999	861
\$200,000 to \$299,999	184
Greater than \$300,000	41

Source: Bureau of the Census 1992.

event of loss of commercial power, the UPS could carry critical loads for 15 minutes, during which time the Central Power Plant emergency power generators could come on line (USAF 1991).

2.3.2 Fuel

Natural Gas-PSCo provides natural gas to the Buckley ANGB through a 4-inch gas main located beneath 6th Avenue (Higginbotham 1988). From 1989 until 1991, the ADF average usage was approximately 186,000,000 cubic feet per year (Parker 1992). This usage included natural gas for space, hot water, and steam heating.

No. 2 Fuel Oil- Buckley ANGB uses approximately 225,000 gallons per year (Melargno 1992) of No. 2 fuel oil for central heating, water heating, and motor vehicle fuel. Buckley ANGB maintains a 200,000-gallon underground storage tank (UST) for transferring fuel by underground pipeline (Higginbotham 1998) to the twelve 16,800-gallon aboveground ADF diesel fuel tanks (Figure 1-3). ADF also has four inactive USTs that will be closed permanently. During 1991, ADF used approximately 15,000 gallons of No. 2 fuel oil (Parker 1992), primarily for backup power generation and testing.

2.3.3 Water Supply

Buckley ANGB obtains water from the City of Aurora, which utilizes a complex transmountain pipeline and reservoir system. Prior to December 1986, Buckley ANGB obtained its water supply from deep wells located on site. The Buckley ANGB water supply system consists of storage and distribution piping, supplying approximately 185,000 gallons per day for domestic consumption, irrigation, and washdown operations. The system is also capable of supplying water necessary for fire protection (Higginbotham 1988).

2.3.4 Wastewater

The Buckley ANGB sanitary sewer consists of a piping network that connects to the City of Aurora wastewater collection system. The City of Aurora and Buckley ANGB have arranged, through contract, to share the responsibilities of wastewater monitoring, removal, and treatment. Buckley ANGB is responsible for monitoring wastewater flow and quality while the City of Aurora is responsible for wastewater transportation and treatment. Buckley ANGB monitors the

wastewater at a vault located in the northwestern portion of the base near 6th Avenue. The volume of Buckley ANGB wastewater ranges from approximately 40,000 to 70,000 gallons per day.

The City of Aurora treats the majority of Buckley ANGB wastewater at the Denver Metropolitan Sewage Disposal District No. 1 Treatment Facility, which is located at 64th Street and York Avenue. The City of Aurora treats a small portion of the Buckley ANGB wastewater at a facility which primarily provides non-potable water to Aurora's parks and golf courses. In the past, the treatment system has experienced difficulties associated with discharges of oil, grease, and fuel from Buckley ANGB; however, these problems have been addressed in recent years (Higginbotham 1988). Current sewage processing facilities are expected to be adequate for the near future (Stearns 1987).

2.3.5 Communications

Buckley ANGB utilizes a government-owned digital telephone system that is connected to the U.S. West Communications commercial system. The majority of Buckley ANGB telephone instruments are leased from AT&T. Most of the onsite cable system is owned and maintained by U.S. West Communications (Johnson 1992).

2.4 CULTURAL RESOURCES

A cultural resources inventory of Buckley ANGB was undertaken in 1990. A total of 3,052 acres within the boundaries of Buckley ANGB, including ADF, was surveyed for cultural sites. The survey recorded 39 archaeological sites and 25 isolated finds (e.g., single flakes of lithic material). The inventory includes 32 sites with prehistoric components, three sites with prehistoric and historic components, and four historic properties. The prehistoric components are lithic scatters with inferred functions of lithic reduction/procurement and/or camping/food processing. The historic components include one farmstead and six localities related to military use of the area. Evaluate soil probing and/or shovel testing and formal testing were conducted at 16 sites. All 39 sites are considered ineligible for nomination of the National Register of Historic Places (Powers 1990).

2.5 NOISE

Noise is produced at Buckley ANGB by the operational activities of the F-16s and other aircraft, and by the test runups of aircraft engines. Although the airfield is operational for 16 hours each

Day, the majority of fighter sorties are flown during daylight between 0900 and 1500 hours. Flying operations are conducted two nights per week between 1800 and 2000 hours in order to fulfill night training requirements. However, transient aircraft operations extend throughout the airfield operating hours and are heaviest on Friday nights and weekends.

Runup operations are conducted either at the end of the runway or at the power cell, located north of Taxiway D. On average, 140 installed aircraft engine runups are conducted per month. Uninstalled engines are run up for an average of 8 hours per month. In general, engine runups are limited to 3 hours on the runway ends. If more than 3 hours are required, the power cell is used. Buckley ANGB has plans for a hush house in the near future, enabling runup operations to be conducted within safe sound levels for personnel (NGB 1991).

The major existing ADF sources of noise are the emergency diesel generators and large building exhaust fans (building exhaust fans are not audible off site). The generator exhaust muffler design specification limits noise levels to the values indicated in Table 2-7, measured at a distance of 75 feet. Normally, generators are operated one at a time for testing purposes. During loss of commercial power, however, all six generators may operate concurrently. Table 2-7 shows calculated noise emissions for various operating configurations. With all six of the existing generators operating, the calculated total noise level at the site boundary is 49 A-weighted decibels (dBA), which is approximately the same dBA as the sounds of a typical suburban day (City of Lompoc 1988) or a moderate rainfall (ASHA undated).

2.6 AIR RESOURCES

National Ambient Air Quality Standards (NAAQSs) have been established for six air pollutants: particulate matter less than 10 microns in diameter (PM₁₀), lead, carbon monoxide, ozone, nitrogen oxides, and sulfur dioxide. The State of Colorado, through its Air Pollution Control Division, is responsible for ensuring that these standards are attained and maintained throughout the state. The State of Colorado also limits total suspended particulate matter (TSP). The standards for the air pollutants listed above are presented in Table 2-8.

The NAAQSs are divided into primary and secondary levels of protection. Primary ambient air quality standards are defined as air-quality levels necessary to protect the public health. Secondary ambient air quality standards are those necessary to protect the public welfare from any known or anticipated effects of an air pollutant.

Table 2-7. Calculated Existing ADF Diesel Generator Noise Emissions

Frequency Band (Hertz) ^a	Design Limit At 75 Feet (Decibels) ^a	Noise Level at Site Boundary (dB) ^b	A-Frequency Adjustment	Noise Levels at Site Boundary (dBA)		
				1 Generator	4 Generator	6 Generators
20-75	87	59	-30	29	35	37
75-150	77	49	-18	31	37	39
150-300	70	42	-10	32	38	40
300-600	64	36	-4	32	38	40
600-1,200	61	33	0	33	39	41
1,200-2,400	60	32	1	34	40	41
2,400-4,800	60	32	1	33	39	41
4,800-10,000	62	34	-1	33	39	41
Logarithmic Sum		60		42	48	49

^aSource: Black & Veatch 1992b.

^b1,800 feet from source.

Buckley ANGB is in the Metropolitan Denver Intrastate Air Quality control Region (MDIAQCR), which is comprised of eight counties, including Arapahoe County. This region is classified as a nonattainment area for PM₁₀, ozone, and carbon monoxide. This means that concentrations of these pollutants in the ambient air exceed primary NAAQSs. The region also exceeds the primary standard for TSP, which is imposed by the State of Colorado. The MDIAQCR does, however, meet the national standards for sulfur dioxide and nitrogen dioxide.

In general, the region has favorable winds and temperature lapse rates for the adequate dispersion of air pollutants; however, during winter, concentrations of carbon monoxide are high due to atmospheric temperature inversions. During summer, because the intensity of ultraviolet or actinic radiation from the sun increases, there are increased levels of photochemical reactions that generate higher concentrations of ozone and photochemical smog. Various atmospheric factors including temperature, precipitation, and wind influence the formation and persistence of air pollutants. Table 2-9 lists average monthly temperature and precipitation data for Denver for the 29-year period of record from 1961 to 1990 and wind data for 1948 to 1990.

ADF has the following three major types of active emission sources:

- Six Caterpillar 2,500-kW emergency power diesel generators located in Building 465, the Central Power Plant (Figure 1-3). ADF experience has been that emergency generators operate less than 250 hours per year.

Table 2-8. Ambient Air Quality Standards

Pollutant	Averaging Time	Concentration
TSP ^a <u>Primary</u>	<ul style="list-style-type: none"> Annual Geometric Mean 24-hour maximum not to be exceeded more than once per year 	75 $\mu\text{g}/\text{m}^3$ 260 $\mu\text{g}/\text{m}^3$
<u>Secondary</u>	<ul style="list-style-type: none"> Annual Geometric Mean 24-hour maximum not to be exceeded more than once per year 	60 $\mu\text{g}/\text{m}^3$ 150 $\mu\text{g}/\text{m}^3$
PM10 ^b	<ul style="list-style-type: none"> Annual Arithmetic Mean 24-hour maximum not to be exceeded more than once per year 	50 $\mu\text{g}/\text{m}^3$ 150 $\mu\text{g}/\text{m}^3$
Lead (Pb) ^b	<ul style="list-style-type: none"> Maximum Arithmetic Mean averaged over a calendar quarter 	1.5 $\mu\text{g}/\text{m}^3$
Carbon Monoxide (CO) ^c	<ul style="list-style-type: none"> 1-hour average not to be exceeded more than once per year 8-hour average not to be exceeded more than once per year 	35 ppm (40 mg/m^3) 9 ppm (10 mg/m^3)
Ozone (O ₃) ^b	<ul style="list-style-type: none"> 1-hour average^a 	0.12 ppm (245 $\mu\text{g}/\text{m}^3$)
Nitrogen Dioxide (NO ₂) ^b	<ul style="list-style-type: none"> Annual Arithmetic Mean 	0.053 ppm (100 $\mu\text{g}/\text{m}^3$)
Sulfur Dioxide (SO ₂) <u>Primary</u>	<ul style="list-style-type: none"> Annual Arithmetic Mean 24-hour maximum not to be exceeded more than once per year 	0.03 ppm (80 $\mu\text{g}/\text{m}^3$) 0.14 ppm (365 $\mu\text{g}/\text{m}^3$)
<u>Secondary</u>	<ul style="list-style-type: none"> 3-hour maximum not to be exceeded more than once per year 	0.5 ppm (1,300 $\mu\text{g}/\text{m}^3$)

^aColorado has retained a TSP standard in addition to a PM10 standard. The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is equal to or less than 1.

^bPrimary and secondary standards are the same.

^cNo secondary standard.

mg/m^3 = Milligrams per cubic meter at 760 mm Hg and 25°C.

PM10 = Particulate matter of less than 10 microns in diameter.

ppm = Parts of pollutant per million parts of air.

TSP = Total Suspended Particulates.

$\mu\text{g}/\text{m}^3$ = Micrograms of pollutant per cubic meter of air at 760 mm Hg and 25°C.

Source: 40 CFR 50, 40 CFR 81.

Table 2-9. Average Monthly Temperature and Precipitation Data for Denver

Month	Average Monthly Temperature (Degrees F)	Average Monthly Precipitation (Inches)	Mean Wind Speed^a (mph)
January	30.1	0.47	8.8
February	32.9	0.57	8.9
March	38.8	1.14	9.7
April	47.7	1.96	10.1
May	56.8	2.43	9.4
June	66.8	1.50	8.9
July	72.8	1.73	8.3
August	71.4	1.43	8.0
September	32.7	1.09	8.0
October	51.5	1.01	7.9
November	39.5	0.69	8.3
December	32.1	0.63	8.5
Annual	50.3	14.67	8.7

Source: NOAA 1990
aAnnual/southerly.

- Twelve 16,800-gallon diesel fuel storage tanks located north of the Central Power Plant (Figure 1-3)
- Eighteen natural gas-fired heating systems (hot-water boilers, steam boilers, and space heaters) located throughout the facility

Table 2-10 identifies the natural gas-fired heating systems, and Table 2-11 shows estimated emissions from active ADF sources.

In addition to the active sources discussed above, ADF has five permitted sources that currently are inactive. These are emergency-power diesel generators located in the South Power Plant, Building 407 (Figure 1-3). Replacement of these older generators was the subject of a 1987 Environmental Assessment (Stearns 1987), which estimated emergency diesel generator emissions to be 185 tons

Table 2-10. Sources of Natural Gas Combustion Emissions (page 1 of 2)

Serial No.	Location	Model	Description	Heat Capacity (10⁶ Btu/Hr)
0-2150	Bldg. 401	Kewanee L3W/100-GO Gas/Diesel	Hot-water boiler	1.7
0-2151	Bldg. 401	Kewanee L3W/100-GO Gas/Diesel	Hot-water boiler	1.7
0-1901	Bldg. 401	Kewanee L3W/100-GO Gas/Diesel	Hot-water boiler	1.7
H-3239	Bldg. 401	Johnston 215-3CG Gas	Steam boiler	2.4
H-3238	Bldg. 401	Johnston 215-3CG	Steam boiler	2.4
60912	Bldg. 401	Bryan 20502 Gas/Diesel	Steam boiler	0.58
R1675	Bldg. 407	Kewanee L3W/KGO Gas/Diesel	Hot-water boiler	0.55
60832	Bldg. 401	Bryan CL90W-FDG Gas/Diesel	Hot-water boiler	0.67
14760	Bldg. 401	Burnham 4F6277-45LB Gas/Diesel	Steam boiler	2.06
14758	Bldg. 401	Burnham 4FL277-45LB Gas/Diesel	Steam boiler	2.06
17303	Bldg. 460	Burnham 4FW- 127-40-50-GP Gas	Hot-water boiler	1.33

Table 2-10. Sources of Natural Gas Combustion Emissions (page 2 of 2)

Serial No.	Location	Model	Description	Heat Capacity (10⁶ Btu/Hr)
17280	Bldg. 460	Burnham 4FW- 127-40-50-GP Gas	Hot-water boiler	1.33
108968357	Bldg. 401	Polyshield 500 P300 ATP Gas	Hot-water boiler	0.4
N89-966P	Bldg. 401	HB Smith Series 28A-6 Gas	Hot-water boiler	1.25
89-E-3326-A-4	Bldg. 402	King National MNTDM 250-80	Gas-fired heating unit	2.6
89-E-3326-A-4	Bldg. 403	King National MNTDM 250-80	Gas-fired heating unit	2.6
89-E-3326-A-4	Bldg. 404	King National MNTDM 250-80	Gas-fired heating unit	2.6
89-E-3326-A-4	Bldg. 405	King National MNTDM 250-80	Gas-fired heating unit	2.6

per year of nitrogen oxides, 14 tons per year of total suspended particulates, 10 tons per year of sulfur dioxide, 40 tons per year of carbon monoxide, and 15 tons per year of volatile organic compounds. ADF intends to declare these generators as surplus material and remove them.

2.7 SURFACE WATER RESOURCES

Lakes and streams are not present on the project site; however, intermittent streams occur within 0.5 mile of the site to the northwest (unnamed) and also to the south (East Toll Gate Creek). The Buckley ANGB reservoir, Williams Lake, is located 2 miles from ADF in a different watershed. The Buckley ANGB storm drainage system consists of surface ditches and channels, reinforced concrete pipe, and corrugated metal culverts. The western portion of Buckley ANGB drains to East Toll Gate Creek, a tributary of Sand Creek, which discharges to the South Platte River. Runoff in the west central portion of Buckley ANGB travels in the form of sheet flow and flow channeled into borrow ditches adjacent to roadways. The merged flow exits Buckley ANGB in a westerly direction via a small channel that is a tributary of East Toll Gate Creek. The runoff passes through a highly-developed residential and commercial area prior to entering the creek.

Table 2-11. Summary of Estimated Existing ADF Air Emissions^a (Tons per Year)

SOURCE	TSP	PM10	SO ₂	NO _x	CO	O ₃ (as VOC)
6 emergency diesel generators	4.4	3.1	4.1	61.8	13.5	5.0
12 diesel-oil storage tanks	NA	NA	NA	NA	NA	0.01
18 natural gas-fired heating systems ^b	0.05	0.05	0.01	0.93	0.19	0.05
TOTAL	4.5	3.2	4.1	62.7	13.7	5.1

^aEmissions information is an average of 1989-1991 (Parker 1992). Emissions are calculated using source emission factors presented in EPA 1990.

^bSpecific natural gas-fired sources are listed in Table 2-12.

NA = not applicable.

VAC = volatile organic compound.

2.8 GEOLOGY, SOILS, AND GROUNDWATER RESOURCES

2.8.1 General Geology

Buckley ANGB is located within the Denver Basin on the Colorado Piedmont is located between the high plains in the east and the Front Range in the west, with regional topography sloping eastward. The Denver Basin is a large north-south trending structural basin containing over 13,000 feet of sedimentary rocks, including shales, sandstones, siltstones, claystones, conglomerates, and coals (Higginbotham 1988).

2.8.2 Soils

The three major soil associations that occur on Buckley ANGB are the Alluvial Land-Nunn association, the Renohill-Buick-Little (RBL) association, and the Fondis-Weld association. The Alluvial Land-Nunn soils are found along Sand Creek (off base to east) and consist of deep, loamy, and sandy soils. RBL soils are found in the vicinity of East Toll Gate Creek. The RBL association is moderately deep and has a loamy to clayey texture. The Fondis-Weld association is formed in silty, wind-deposited materials and lies mainly on the lever areas at Buckley ANGB (Higginbotham 1988).

The native soil in the ADF area consists of Fondis silt loam soil, typically with 1 to 3 percent slopes. This soil is deep, usually greater than 60 inches. The surface layer is approximately 7 inches thick and lies abruptly over the subsoil. The upper part of the subsoil is dense clay about 20 inches thick. In the lower part of the subsoil are layers of buried soil, consisting of yellowish-brown clay loam. The depth to lime concentration is 14 to 20 inches. Although the Fondis soil pH is near neutral (6.7 to 7.5) in the top 32 inches, it increases in alkalinity between 32 and 60 inches in depth (7.5 to 9.0). The Fondis soil, susceptible to wind and water erosion has a high shrink/swell potential, moderately slow permeability, and slow internal drainage (Lynn 1971).

2.8.3 Seismic History

The State of Colorado has had a relatively low frequency of earthquakes in historic time, with the maximum intensity attributed to deep, underground fluid injection at Rocky Mountain Arsenal in the 1960s (Stearns 1987). National Earthquake Information Center records indicate a maximum

intensity of 5.3 on the Richter scale for this activity (Reagor 1992). The effects of other earthquakes have been felt only in the local area, and magnitudes of all earthquakes have generally been such that no damage resulted to buildings. Buckley ANGB lies within Seismic Risk Zone 1, where minor damage could be expected from seismic activity (Stearns 1987).

2.8.4 Groundwater

Buckley ANGB lies within the Denver groundwater basin. In descending order, the principal aquifers underlying the base are the Denver Formation and the Arapahoe Formation, both having water-bearing layers of approximately 150 to 175 feet thick. Within the aquifers, groundwater flow at the base is generally in a north-northwesterly direction towards troughs along the South Platte River. Groundwater quality, generally good in the Denver and Arapahoe Aquifers, meets the U.S. Environmental Protection Agency (EPA) drinking water standards. Chemical analysis of water drawn from the Buckley wells shows excessive fluoride, but no other constituents that exceed drinking water limits.

Although Buckley ANGB has obtained water from the City of Aurora since December 1986, four deep-water wells still exist on the installation. Of these, two are closed, one is in the process of being closed, and one remains open to replenish water in the reservoir during the dry season. There are approximately 40 wells for both domestic and livestock use, immediately north and northwest of Buckley ANGB. Because of the northwesterly flow of the groundwater, there is a potential for hazardous substances at the surface or subsurface on Buckley ANGB to contaminate the water supply in this area (Higginbotham 1988).

2.9 BIOLOGICAL RESOURCES

2.9.1 Regional

Buckley ANGB lies within the high plains area that extends from the Great Plains to the foothills of the Rocky Mountains. Prior to settlement, the dominant ecosystem was a mixed prairie that consisted primarily of perennial bunchgrasses. Dry sites were dominated by short grasses such as blue grass and buffalo grass, while more moist sites were dominated by taller grasses such as western wheatgrass and little bluestem. Under natural conditions, the major plant communities were probably upland prairie or short grass plains, meadows, and cottonwood-willow. The grassland areas were inhabited by large prairie dog colonies or “towns,” and large ungulates such as the American bison and pronghorn. Tree growth occurred only along the streams.

Human activities have resulted in considerable changes in the regional biological resources. The present biotic communities can be classified as cultivated vegetation, uplands vegetation, riparian and aquatic vegetation, and urban/residential vegetation. Approximately 30 percent of Arapahoe County is used for cultivation and livestock grazing. Remaining uncultivated lands are generally used for urban and residential purposes. Uplands vegetation includes pasture and range lands, and soil character and historic use determine plant species composition. Overgrazing of tall grasses has allowed the short grasses to increase their abundance in the upland community. Riparian and aquatic vegetation occurs along major watercourses. Urban/residential vegetation is a cross-section of many plant types from the Midwestern and eastern United States.

Animal diversity is generally lower in western rangelands and farming areas than woodlands, with faunal communities dominated by ground-nesting birds, small burrowing mammals, and the predators dependant on these birds and mammals for food. Riparian corridors often support a higher diversity of species than surrounding rangelands, providing critical habitat for otherwise absent aquatic life. The wetter soils of these areas support more vegetative diversity (including a variety of shrubs and trees) than the drier soils of adjoining prairie; and a variety of amphibians, reptiles, upland game birds, migratory waterfowl, wading birds, songbirds, birds of prey, small mammals, and large mammals are found along these watercourses (Stearns 1987).

2.9.2 Buckley ANGB

Outside of developed areas (see land use discussion in Section 2.1), the 1,400 acres of Buckley ANGB open space are dominated by grasslands. The primary type of native flora and fauna found on the Buckley ANGB is representative of the plains grassland ecosystem, and lists of Buckley ANGB vegetation and wildlife species can be found in the Base Master Plan. Prairie dogs (*Cynomys ludovicianus*) are ubiquitous, and other small mammals, such as pocket mice (*Perognathus* spp.), voles (*Microtus* spp.), pocket gophers (*Geomys* and *Thomomys* spp.), cottontails (*Sylvilagus* spp.) and jackrabbits (*Lepus* spp.) may be present. Although the scarcity of forested areas at Buckley ANGB limits the abundance and diversity of perching birds, largely-terrestrial, ground-nesting prairie birds such as the horned lark (*Eremophila alpestris*), killdeer (*Charadrius vociferous*), and the burrowing owl (*Athene cunicularia*) occur. Predators include coyotes (*Canis latrans*), the Western rattlesnake (*Crotalis viridis*), and various hawks and owls (Higginbotham 1988).

The headwaters of a small, unnamed, intermittent stream and East Tollgate Creek (Section 2.7) form the only Buckley ANGB riparian corridors close to the ADF. Diversity of small mammals and birds is generally higher along these watercourses than in adjacent open areas. Mule deer have been observed along East Tollgate Creek (NGB 1991). This is an indication of the importance of these riparian areas to larger, more conspicuous mammals. Pronghorn antelope have also been sighted on Buckley ANGB.

2.9.3 ADF Project Site

The entire area proposed for development has been disturbed in the past and may be described as “light industrial” in appearance and function. There are no streams or wetlands in the project area, which is surrounded by office buildings, storage buildings, access and perimeter roads, parking areas, and security fencing. The project site is sparsely vegetated with low grasses, forbs, and weeds such as Russian thistle (*Salsola kali*) and, therefore, provides only marginal wildlife habitat. Due to the industrial character of the project area, no systematic surveys of terrestrial wildlife or birds have been conducted. Prairie dogs are the only readily visible wildlife residents in the area; ground-nesting birds, mice, voles, rabbits, and snakes may be present. However, constant human activity and the poor quality of the habitat (compacted soils, sparse vegetation, limited food supply, and lack of escape cover) in all likelihood combine to limit diversity and abundance of small mammals and their predators.

2.9.4 Threatened and Endangered Species

The only Federally-listed species known to occur on the Buckley ANGB is the endangered bald eagle, which is an occasional visitor in winter, preying on the base's prairie dogs (NGB 1991). The base is located within the historical range of another Federally-listed species, the endangered black-footed ferret (*Mustela nigripes*), which has not been sighted in recent years on the base (Higginbotham 1988). Two Federally-listed peregrine falcon sub-species, the endangered American peregrine (*Falco peregrinus anatum*) and the threatened Arctic peregrine (*Falco peregrinus tundrius*), are known to migrate through eastern Colorado, but they have not been sighted on Buckley ANGB.

2.10 FLOODPLAINS AND WETLANDS

East Toll Gate Creek is an intermittent stream that crosses the Buckley ANGB south and southeast boundaries. A 1983 study by COE defined the 100-year East Toll Gate Creek flood; no other

100-year floodplain crosses the base (Hunter/ESE 1989). The East Tollgate Creek 100-year floodplain passes approximately 2,600 feet southeast of the ADF. At the point, the 100-year floodplain elevation is approximately 5,495 feet above mean sea level. This is 35 feet below the ADF elevation of approximately 5,530 feet.

Buckley ANGB wetlands have been identified using U.S. Fish and Wildlife Service (FWS) National Wetlands Inventory Maps, aerial photographs, and field reconnaissance. Only a few small wetlands exist in the East Tollgate Creek floodplain and adjacent to Williams Lake, which is an artificial impoundment fed by pumped groundwater and used for Base recreation (Hunter/ESE 1989). These areas are approximately 2 miles from the ADF.

2.11 VISUAL RESOURCES

ADF is located on an undulating plain at approximately 5,530 feet above sea level east of the Denver metropolitan area (Figure 1-1). ADF, as situated within Buckley ANGB, is located in a transitional area between dense urban development to the west and mostly agricultural lands to the east. Light industrial development is occurring to the north of Buckley ANGB, while mixed light commercial and housing uses occur to the south.

The immediate visual environment of ADF is the surrounding Buckley ANGB, which is characterized as industrial with visually important structures, including radomes, and airplane hanger, and the air traffic control tower. The most visually prominent features on ADF are the four radomes (Figure 1-3) due to their height (approximately 110 feet), spherical shape, alignment, and white coloration. The remaining ADF buildings are low-profile (one to two stories in height) and are designed to integrate with other buildings on Buckley ANGB through the use of common coloration and surface features.

From areas immediately adjacent to the south and west boundaries of Buckley ANGB, the ADF radomes are visible on an intermittent basis only due to terrain changes. For some locations in this primarily residential and commercial area, the radomes may be visually important. For areas immediately adjacent to the east boundary of the base, the ADF radomes are not visible due to the intervening terrain. The radomes become more visually dominant in the landscape from the agricultural and commercial areas located immediately north of the base (Figure 1-2).

From distant view points, the existing ADF radomes and other Buckley ANGB facilities are visible from the west and the north-northeast due to higher terrain. The radomes are relatively prominent

features as viewed from tall buildings in the Denver metropolitan area and in general from the front range in the Denver vicinity. The radomes are less prominent to the north and northeast (e.g., from Interstate 70) because they are situated low on the horizon and are visually integrated with the dominant urban background.

2.12 WASTE MANAGEMENT

2.12.1 Solid Waste

Buckley ANGB solid waste collection and disposal are handled through a service contract. Contractor-owned container, ranging from 2-cubic-yard dumpsters to 40-cubic-yard rolloff-type containers, are located throughout Buckley ANGB. The contractor routinely transports accumulated waste off site for disposal.

Buckley ANGB has performed a comprehensive survey to identify base hazardous waste streams. The base generates approximately 2,200 pounds per month, which are stored at various satellite points and one central accumulation are prior to being transported off site for treatment and disposal. Buckley ANGB hazardous waste management practices are described in a base management plan (COANG 1992a).

The bulk of ADF waste generated is office-type waste (paper and cardboard). Recycled items include used oil, batteries, and refrigerant. ADF has also performed a hazardous waste stream evaluation, concluding that ADF generates a relatively small amount of Buckley ANGB hazardous waste (approximately 220 pounds per month). Solvent wastes, document reproduction and graphics wastes, and de-scaler water treatment wastes are routinely generated (TRW Inc., et al. 1991).

2.12.2 Spill Prevention

The frequent use of hazardous materials, particularly JP-4 jet fuel, is integral to the type and level of activities at Buckley ANGB. The Spill Prevention and Response Plan (COANG 1992b) prescribes coordinated base-wide actions to protect the environment from the damaging effects of oil spills and hazardous substances.

3.0 POTENTIAL IMPACTS AND MITIGATION MEASURES

This chapter describes potential impacts to the environment and, where appropriate, suggested measures to mitigate those impacts. Potential environmental effects determined for the Proposed Action are discussed cumulatively, utilizing the background information presented in Chapter 2.0.

3.1 EXISTING FACILITY

The following sections discuss specific impacts of the Proposed Action.

3.2 SOCIOECONOMIC RESOURCES

The Proposed Action would be roughly equivalent in size and nature to a moderately-sized commercial facility such as an office building. The City of Aurora (and the Denver metropolitan area) possesses sufficient labor force and other resources to support routine construction projects of this size (estimated peak workforce requirement of 400 for a maximum of 18 months) so that work force immigration would not be required. Utilization of these existing resources would minimize potential adverse socioeconomic impacts. The approximate \$40 million construction expenditure and secondary (or induced) effects would result in a small cumulative beneficial impact on regional income. Impacts to local transportation resources, primarily local streets, are expected to be minimal since construction-related commuter traffic, and estimated 400 vehicles per day, would represent a temporary (18-month) increase that is minor in a community population of more than 200,000.

As indicated in Section 2.1.1, Buckley ANGB will have several construction activities underway at the same time as the Proposed Action. Potential ADF and Buckley cumulative traffic impacts were analyzed and are expected to be limited to potential onsite congestion.

Since the ADF expansion will be occupied by existing staff moved from temporary trailer offices, staffing and expenditures would not change substantially from current levels. Therefore, operation of the Proposed Action is not expected to impact socioeconomic resources.

3.3 UTILITIES

This section examines the expected impacts of the Proposed Action on public and Buckley ANGB utilities (i.e., electrical power, fuel, water supply, wastewater, and communication) that were

described in Section 2.3. Utility impacts analyzed included the need for increased production and distribution capacity to meet demands created by population increases (area residential in-migration and site workforce expansion) and equipment changes. The significance of the impacts can be affected by the extent of demand changes and the age and capacity of existing systems.

Proposed construction activities would have negligible impacts on utilities. The construction workforce would be drawn primarily from the existing workforce within the area, resulting in minimal in-migration (Section 3.2). Construction workforce electrical power usage would be minimal relative to operational usage discussed below. Contractors would bring their own fuels on site, so fuel usage would not impact base supplies. Water usage would include concrete work, watering for dust control, and potable consumption and sanitary waste by workers. Assuming water consumption of 50 gallons per day (Fair 1966), the peak construction workforce may account for a temporary increase in domestic water consumption of 20,000 gallons per day. This would have negligible impacts on the water delivery system. Wastewater generation rates would similarly be temporarily increased. Communication system impacts are expected to be negligible because the construction workforce would not be part of the Buckley ANGB system.

The Proposed Action would not result in in-migration for operations; the proposed addition would be staffed by personnel moving out of temporary office space in trailers that would be removed. The estimated maximum demand, based on maximum capacity, would be 6 MW (Hester 1992a), approximately doubling current demand. Some of the additional capacity would replace existing capacity as staff move from trailer, but most capacity would serve additional computer equipment. However, even doubling historical ADF usage is not expected to impact the PSCo system reserve capacity of approximately 800 MW due to the small size of the incremental increase (less than 1 percent). PSCo has reviewed the Proposed Action and determined that it would not necessitate upgrading the PSCo lines or substation (Smith 1992).

The Proposed Action includes adding four natural-gas combustion units (for hot water and steam) to the existing 18 units, representing a potential increase in demand of approximately 20 percent, or 40 million cubic feet per year of natural gas demand. This is expected to have a negligible impact on the PSCo system capacity of 130 billion cubic feet due to the small size of the incremental increase (0.03 percent). The capacity of the line serving the ADF has been analyzed and would be sufficient to handle the proposed action with no changes recommended (Black & Veatch 1992c).

Because the proposed ADF addition will house the existing workforce, the Proposed Action would not change routine water, wastewater, or communication systems usage. Additional fire protection requirements would increase potential water usage slightly.

3.4 CULTURAL RESOURCES

Potential impacts to cultural resources from construction are associated with ground-disturbing activities such as clearing and grubbing. Potential impacts from the Proposed Action are expected to be minimal since cultural resources eligible for nomination to the National Register of Historic Places are not present at the proposed site (Section 2.4 and Appendix A). Cumulative impacts (i.e., potential impacts from the Proposed Action when considered in addition to past activities) would also be negligible due to the absence of cultural resources. If cultural resources are encountered during construction, potential impacts would be mitigated to the extent possible through avoidance, as well as consultation with the Office of Archaeological and Historic Preservation of the Colorado Historical Society.

Operations of the Proposed Action would not impact cultural resources since ground-disturbing activities are not expected to occur after the completion of construction.

3.5 NOISE

This section examines the expected impacts of the Proposed Action on ambient noise levels. Noise impacts are a function of changes in noise volume, duration, and proximity to receptors.

The major source of noise emissions from the Proposed Action would be the two diesel generators. These generators would be identical to the existing generators, and their noise emissions would be the same as those described in Section 2.5. The Proposed Action would increase the number of generators that may operate simultaneously from six to eight, increasing by one-third the required hours of routine operational testing. Table 3-1 describes the noise-emissions impact of adding two generators to the current four-generator operations configuration. As shown, the expansion would increase noise levels at the site boundary by 1 dBA. The cumulative noise level, 51 dBA, would still be approximately the same as the sounds of a typical daytime suburban background or a moderate rainfall (as described in Section 2.5 for the existing noise environment).

Table 3-1. ADF Diesel Generator Noise Impacts

Frequency Band (Hertz)	Noise Levels at Site Boundary (dBA) ^a	
	Six Generators	Eight Generators
20-75	37	39
75-150	39	41
150-300	40	42
300-600	40	42
600-1,200	41	43
1,200-2,400	41	43
2,400-4,800	41	43
4,800-10,000	41	43
Logarithmic Sum	49	51

^a1,800 feet from source.

3.6 AIR RESOURCES

This section examines the potential impacts of the Proposed Action on the existing air resources described in Section 2.6. Potential impacts include fugitive particulate emissions from construction activities and point-source operations emissions from new equipment. The importance of impacts would be a function of emission quantities and toxicity, control measures adopted, proximity to off-base areas, and cumulative effects (total emissions) from Buckley ANGB.

Construction-related air-quality impacts are expected to be minor and temporary, lasting less than 18 months. Proposed construction activities that would generate fugitive particulate emissions are identified below:

- Clearing, Grubbing, Grading, and Excavating - This activity includes initial site-preparation activities and final site cleanup.
- Hauling - Approximately 41,000 cubic yards of waste soil would be hauled off for disposal (Black & Veatch 1992c).

- Traffic - Construction traffic would be on approximately 4,800 feet of unpaved road. This traffic includes worker vehicles and trucks hauling waste soil.

Based on emission factors published in AP-42 (EPA 1990), particulate fugitive dust emissions for 2-acre industrial construction activities have been estimated to total 2.4 tons per month. These emissions would be reduced by as much as 50 percent, however, by wetting unpaved vehicle traffic areas and placing covers over soil in transport trucks. Additional measures that may be used as needed include installing wind barriers and spray-on adhesives and reducing truck speed. The fugitive particulate emissions would occur at ground level, thus limiting dispersion and offsite impact. Impacts to air resources from construction activities are expected to be temporary, minimal, and limited to the Buckley ANGB site. See Section 4.1 for related discussion of permit and regulatory compliance requirements.

As indicated in Section 2.1.1, Buckley ANGB will have several construction activities underway at the same time as the Proposed Action. Potential ADF and Buckley cumulative fugitive particulate emission impacts were analyzed and are expected to be minor because of the short duration, because Buckley ANGB construction activities are routine in nature, and because impacts are expected to be incurred onsite.

The Proposed Action would involve installation of the following new equipment that would generate air emissions:

- Two 2,500-kW emergency power diesel generators (EPDGs)
- Two natural-gas-fired hot-water heaters
- Two natural-gas-fired steam boilers
- Three cooling tower cells for two new 1,000-ton-capacity chillers

Table 3-2 summarizes estimated emissions associated with the proposed new ADF combustion sources and cumulative ADF emissions. The proposed new combustion sources represent a potential 30-percent increase in existing ADF emissions. EPDG emissions are minimized by the limited time of operation, estimated to be less than 250 hours per year for periodic unit evaluation and for emergency situations caused by loss of commercial power. Emissions from the heaters and boilers are minimal due to the use of natural gas, the small unit size, and seasonal operation for steam boilers. Although no regulatory limits apply directly to the ADF sources due to their small size or limited operating time, Table 3-2 compares these emission rates to the Buckley ANGB permit limits discussed in more detail in Section 4.1.

**Table 3-2. Summary of Estimated Proposed ADF Operations Air Emissions^a
(Tons Per Year)**

SOURCE	TSP	PM ₁₀	SO ₂	NO _x	CO	O ₃
Two emergency diesel generators	1.5	1.1	1.4	20.6	4.5	1.7
Natural-gas-fired heating systems	0.01	0.01	0.002	0.21	0.04	0.01
Total Proposed Emissions	1.5	1.1	1.4	20.8	4.5	1.7
Total Existing Emissions (from Table 2-13)	4.4	3.2	4.1	62.7	13.7	5.1
Cumulative Total	5.9	4.3	5.5	83.5	18.3	6.8
Buckley ANGB Permit Limits	99.9	99.9	249.9	249.9	99.9	99.9

^aEmissions are calculated using source-emission factors presented in AP-42 (EPA 1990) and maximum emergency diesel generator operations of 250 hours per year per generator.

The primary cooling tower emission would be water vapor, with trace amounts of chiller system water-treatment chemicals (e.g., dispersants, biocides, and water-softening chemicals). In general, treatment chemical feed rates are in the parts per million range, and most chemicals are preferentially attracted to the water phase. Release to the air, therefore, is expected to be negligible.

On June 8, 1992, CDH issued initial approval of a new Buckley ANGB air emission permit that includes the ADF. A new feature of the permit is limits on cumulative Buckley ANGB emissions (commonly referred to as “bubble” limits). This makes it theoretically possible for emissions from the Proposed Action to cause Buckley ANGB permit exceedances if existing emissions are close to the limits. Existing Buckley ANGB emissions are not completely known, however, so CDH has required Buckley ANGB to conducting a survey of existing sources.

Pending completion of that survey and subsequent CDH acceptance, Buckley ANGB compliance status and the Proposed Action increment significance cannot be definitively ascertained. Because the Proposed Action increment is so small, as discussed in Section 3.6, it is not likely to have a significant impact on the Buckley ANGB compliance status. If Buckley ANGB is found to exceed

the permit limits, regulatory requirements would impose additional technological controls, reducing environmental impact. Therefore, in either case, the cumulative impact would not have a significant environmental impact.

3.7 SURFACE WATER RESOURCES

This section examines impacts that the Proposed Action would have on surface water resources. Potential impacts analyzed were water quality (primarily through erosion), or quantity degradation (or improvement) and access changes.

Section 3.8 discussed potential soil-erosion impacts, which could also be expected to affect surface waters. Because of the low probability of substantial soil erosion (due to the small area of disturbance and lack of significant slopes) and the distance (0.5 miles) to the nearest natural waterway (intermittent tributary to East Toll Gate Creek), soil erosion impacts to surface waters are expected to be minimal. Impacts would be mitigated by using best management practices (BMPs) and by implementing the Buckley ANGB Spill Prevention, Control, and Countermeasures (SPCC) Plan. Because the proposed expansion would be staffed with existing personnel, wastewater flow is not expected to increase. Therefore, surface water impacts are not expected from any change in ADF wastewater flowing through the City of Aurora wastewater treatment system. The proposed expansion would not affect surface water access.

3.8 GEOLOGY, SOILS, AND GROUNDWATER

This section examines the expected impacts of the Proposed Action on soils and groundwater. Because of the low risk associated with seismic activity (see Section 2.8), geologic impacts are not addressed. Erosion (e.g., removal of vegetation and the subsequent disturbing action of wind, runoff, and the movement of heavy vehicles across unprotected soils) and contamination (e.g., spills of hydrocarbons or other liquids from vehicles) were analyzed for potential impacts to soils. The potential for groundwater contamination from spills was also analyzed.

The Proposed Action would require the removal of existing concrete and bituminous pavements, fencing, and underground utilities. Several facilities would require relocation. Also, the foundation of a small, inflatable radomes would be removed. The remaining ground surface needed for the expansion is only sparsely vegetated with a few patches of ground cover.

Because the majority of the area proposed for construction has already been extensively disturbed and little vegetation remains, it is not likely that construction activities would result in a substantial increase in erosional activity. There is some risk of soil contamination from construction vehicles. This potential impact would be minimized through the use of BMPs and SPCC Plan.

Because erosion would not be of concern in the case of the Proposed Action, it is likely that erosional runoff would have little effect on surface water in the area and therefore little effect on groundwater in the area. Some groundwater contamination may result from the leaching of construction-vehicle-contamination soils. However, as noted above, appropriate precautions would minimize this potential impact. Upon project completion, slopes would be reseeded.

3.9 BIOLOGICAL RESOURCES

This section describes potential impacts to biological resources from the Proposed Action.

Proposed Action impacts would be limited to loss of some marginal small mammal and reptile habitat (less than 5 acres) and some minor losses of small mammals rendered more vulnerable to predation as a result of displacement. It is possible that reptiles, such as the Western rattlesnake, that use prairie dog burrows could also be displaced by construction activity or killed if these burrows are filled, crushed, or paved over. The noise and human activity associated with the Proposed Action would likely drive small mammals and ground-nesting birds from the project area. Buckley ANGB and ADF experience has shown that this is true for prairie dogs (Hester 1992b).

Small mammals such as prairie dogs provide food for a number of predators including coyotes, hawks, and owls. However, because the project site is small, is ringed by development, and provides only marginal small-mammal habitat, no impacts to these mammalian and avian predators are expected to result from construction or operation of the proposed ADF addition.

An informal consultation with the FWS Colorado Field Office has been undertaken in accordance with Section 7 of the Endangered Species Act (16 USC 1351 *et seq.*). The opinion rendered by FWS is that the Proposed Action is not likely to impact any Federally-listed species or jeopardize the continued existence of threatened or endangered species' critical habitat (Appendix B).

3.10 FLOODPLAINS AND WETLANDS

The Proposed Action is not located on a floodplain or in a wetland. Because the project site is approximately 2,600 feet from, and 35 feet higher than, the nearest floodplain (East Toll Gate Creek), the Proposed Action is expected to have negligible impact on floodplains. Similarly, because of the distance to the nearest wetland on East Toll Gate Creek, together with the minor surface water impacts discussed in Section 3.7, negligible impacts to wetlands are expected.

3.11 VISUAL RESOURCES

This section examines potential impacts to visual resources from implementation of the Proposed Action. Due to existing developed conditions (Section 2.11) and the size and appearance of the proposed addition, implementation of the Proposed Action would not adversely impact visual resources. Considered cumulatively, the proposed addition would be an extension of a visually minor feature in a site dominated by the existing radomes and other large Buckley ANGB structures. Subsection 3.6.1 discusses fugitive particulate emissions that are expected as a result of proposed ADF construction activities. These emissions may be visible from areas immediately adjacent to the base such as East 6th Avenue and Buckley Road. This impact is expected to be negligible due to the temporary nature of the activity and the control measures to be used.

Impacts to visual resources are not expected from operations of the Proposed Action since the nature of existing operations would not change.

3.12 WASTE MANAGEMENT

This section examines the expected waste management impacts of the Proposed Action. Waste management impacts are a function of changes in waste volume and toxicity, as well as management techniques used.

The principal ADF construction waste would be excavated soil. The construction contractor would be required to transport excess excavated soil to the Buckley ANGB Overburden Stockpile (Figure 1-2), where the Base retains such material because it is suitable for use as fill material for other projects. Expected small quantities of other construction site wastes would be disposed off base, and construction waste management impacts are expected to be minor.

The bulk of the operational wastes that would be generated from the proposed expansion would be office-type waste (e.g., paper and cardboard). Because the expansion would be staffed by personnel already on site in temporary office trailers, this waste type and volume is not expected to change from current levels. Because two additional emergency generators and chillers would be constructed, the Proposed Action would increase by one third the quantity of used lubricating oil and refrigerant to be recycled. The additional UPS capacity would also increase the number of batteries that the manufacturer (Exide) would recycle in case of battery failure.

4.0 PERMITS AND REGULATORY COMPLIANCE

This chapter discusses environmental protection permits and regulatory requirements applicable to the Proposed Action. Table 4-1 summarizes the activities required to achieve permit and regulatory compliance.

Table 4-1. Permit and Regulatory Compliance Activities Summary

Activity	Status of Current Operations	Requirements Applicable to Proposed Action
Cultural Resources	Cultural surveys conducted	Informal consultation conducted with Colorado Historic Preservation Office (Appendix A)
Air Emissions	Emission permit issued	APENs to be filled for two new emergency diesel generators, two hot-water boilers, and two steam boilers. APEN and fugitive particulate emission control plan to be filed for construction activities.
Biological Resources	Black-footed ferret surveys conducted	Informal consultation conducted with FWS (Appendix B)

4.1 AIR EMISSIONS

The Federal Clean Air Act (CAA), Title 42, United States Code, Section 7401 et seq. (42 USC 7401 et seq.) governs air emissions. CAA delegates regulatory authority to EPA but authorizes states to enforce state requirements in lieu of EPA requirements if EPA first approves the state requirements in lieu of EPA requirements if EPA first approves the state requirements as being as stringent as, or more stringent than, EPA requirements. EPA has approved the Colorado Air Pollution Control Program implemented by CDH. CAA requires Federal facilities to comply with state air pollution requirements; and Executive Order (EO) 12088, Federal Compliance with Pollution Standards, directs Federal agency compliance. U.S. Department of Defense (DOD) Instruction 4120.14 implements EO 12088 for DOD departments such as USAF.

CDH has issued Emission Permit 90AR147 to Buckley ANGB for equipment listed in Attachment A of the permit, including ADF emission sources. Table 4-2 identifies the permit emission limits that are not to be exceeded by the total of all Buckley ANGB emissions (commonly referred to as “bubble” limits). The permit requires Buckley ANGB to submit for CDH approval a proposed emission calculation procedure and a demonstration of compliance with the permit and applicable regulatory requirements.

Table 4-2. Buckley ANGB Air Emission Limits

POLLUTANT	EMISSION LIMIT (TONS PER YEAR)
PM ₁₀	99.9
TSP	99.9
SO ₂	249.9
NO _x	249.9
VOC	99.9
CO	99.9

Source: CDH 1992.

Permit Condition 8 requires Buckley ANGB to submit to CDH and APEN for new sources that will not cause permit emission limit exceedances (permit modification is required if limits would be exceeded). In accordance with this requirement, Buckley ANGB will submit APENs for the proposed two additional diesel emergency generators, the proposed two hot-water boilers, and the two steam boilers.

CDH regulations also require APENs and fugitive particulate emission control plans for surface-area disturbances such as clearing, grubbing, grading, and excavating. The regulations require facilities that are located in nonattainment areas, such as ADF, to use all available and practical methods that are technologically feasible and economically reasonable to minimize fugitive particulate emissions. Watering the site during earth-moving and grading operations, watering the road, and covering waste soil in trucks would help to reduce fugitive particulate emissions during construction. Buckley ANGB will submit an APEN and a fugitive particulate emission control plan for the ADF construction activities.

4.2 WASTEWATER DISCHARGES

The Federal Clean Water Act (CWA; 33 USC 1251 et seq.) governs wastewater discharges. EPA administers the law using many regulations, including 40 CFR 122, 125, 131, 401, and 403. CWA authorizes EPA approval of state and local programs, and CDH and local agencies implement and EPA-approved program. CWA requires Federal facilities to comply with Federal, state, and local requirements; EO 12088 directs Federal facility compliance; and AFR 19-7 and AFR 86-4 implement the USAF programs.

ADF discharges its wastewater to the Buckley ANGB wastewater system which, in turn, discharges to the City of Aurora publicly-owned treatment works. Buckley ANGB operates under Industrial Wastewater Discharge Permit No. I-103.1 for its discharge to the City, with monitoring requirements. The proposed ADF modification would not change wastewater regulatory requirements applicable to ADF and would not necessitate permit modifications.

4.3 SPILL PREVENTION

Pursuant to CWA Section 311, EPA promulgated 40 CFR 110 and 112, requiring SPCC planning. As discussed in Section 4.2, this and other CWA regulatory programs are implemented by CDH or local jurisdictions in Colorado. In general, the SPCC Plan requirement is imposed as a discharge permit condition. AFR 19-1 requires each major command to ensure that procedures are developed for handling accidental pollution incidents.

ADF is subject to the Buckley SPCC Plan (COANG 1992b), implementation of which is a condition of the Buckley ANGB discharge permit discussed previously in Section 4.2. The proposed ADF modification would not change spill prevention regulatory requirements applicable to ADF and would not necessitate plan modifications.

4.4 WASTE MANAGEMENT

4.4.1 Hazardous Waste Management

Hazardous waste management is subject to the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA). RCRA governs hazardous waste handling, storage, treatment, transportation, and disposal. The law delegates regulatory authority to EPA but authorizes states to enforce state hazardous waste management requirements in lieu of EPA requirements if EPA first approves the state requirements as being as stringent as, or more stringent than, EPA requirements. EPA has approved the Colorado hazardous waste management program administered by CDH. CDH has established its requirements in CCR, Chapter 1007. RCRA directs Federal facilities to comply with Federal, state, and local hazardous waste management requirements, and EO 12088 directs Federal facilities to comply with RCRA. AFR 19-11 requires each major command to manage hazardous wastes in accordance with Federal and state hazardous waste regulations.

The Base and the ADF generate hazardous wastes, and the Buckley Hazardous Waste Management Plan (COANG 1992a) is applicable to ADF. The plan addresses Buckley ANGB satellite and centralized (less than 90-day) accumulation points. Buckley ANGB and the ADF use permitted commercial companies for offsite shipments and disposal. Because Buckley ANGB and the ADF do not treat, store longer than 90 days, transport, or dispose hazardous waste, a RCRA permit is not required. The proposed ADF modification would not change hazardous waste regulatory requirements applicable to ADF and would not require a permit.

4.4.2 Nonhazardous Solid Waste Management

RCRA Subtitle D governs nonhazardous waste management; and EPA has issued guidelines for state use (40 CFR 240-259). RCRA directs Federal facilities to comply with state and local requirements, and the State of Colorado and local jurisdictions regulate solid waste management. AFR 19-1 directs USAF installations to use municipal or regional waste disposal systems for solid waste disposal whenever feasible. In compliance with this directive, ADF and Buckley ANGB use local waste haulers. The proposed ADF modification would not change nonhazardous waste regulatory requirements applicable to ADF.

4.5 UNDERGROUND STORAGE TANKS

RCRA Subtitle I governs USTs containing hazardous substances, including petroleum substances. EPA administers this law through 40 CFR 280 and 281. RCRA authorizes states to enforce their own UST programs in lieu of EPA requirements if EPA first approves the state requirements as being as stringent as, or more stringent than, EPA requirements. EPA has approved the Colorado UST program administered by CDH and the Colorado Department of Labor and Employment. CDH regulations are at CCR Title 6, Chapter 1007, Article 5; and Department of Labor regulations are at CCR Title 7, Chapter 1101, Article 14. The Colorado regulations generally parallel EPA regulations, with CDH administering release reporting, corrective action, and closure requirements, and Department of Labor administering design, construction, installation, notification, operating, and release detection requirements. To the EPA requirements, the Department of Labor has added a requirement for a permit to install. RCRA directs Federal facilities to comply with Federal, state, and local UST requirements, and Air Force Policy Letter dated May 30, 1990, establishes the USAF program.

ADF has four inactive USTs. The proposed ADF modification would not (1) add USTs; (2) change regulatory requirements applicable to ADF; or (3) require permitting.

4.6 WATER SUPPLY

The Safe Drinking Water Act (SDWA) governs public water systems water quality. EPA administers the law through 40 CFR 141, 142, and 143. SDWA authorizes (1) EPA to approve state and local drinking water programs and (2) CDH and local agencies to implement and EPA-approved program. SDWA requires Federal facilities to comply with Federal, state, and local requirements; EO 12088 directs Federal facility compliance; and AFR 161-44 establishes the USAF program. The ADF and Buckley ANGB drinking water system consists only of distribution and storage facilities and obtains water from the City of Aurora. The proposed ADF modification would not change water supply regulatory requirements applicable to ADF.

4.7 BIOLOGICAL RESOURCES

Several Federal laws require Federal agencies to consider the impacts that their actions have on biological resources, and some impose a requirement to mitigate impacts. Listed below are some of these laws:

- Endangered Species Act, 16 USC 1531 *et seq.*
- Bald Eagle Protection Act, 16 USC 668 *et seq.*
- Fish and Wildlife Conservation Act, 16 USC 2901 *et seq.*
- Migratory Bird Conservation Act, 16 USC 715 *et seq.*
- Migratory Bird Treaty Act, 16 USC 701 *et seq.*
- National Environmental Policy Act, 16 USC 4321 *et seq.*

Section 7 of the Endangered Species Act requires Federal agencies to consult with FWS when a project might impact endangered or threatened species and their habitats. Appendix B contains the results of informal consultation with FWS regarding potential impacts from the Proposed Action. As stated in the FWS determination, it is believed that ADF would not impact endangered or threatened species.

4.8 CULTURAL RESOURCES

Listed below are Federal laws requiring Federal agencies to consider the impacts that their action have on cultural resources:

- National Historic Preservation Act, 16 USC 470 *et seq.*
- Archaeological Resources Preservation Act, 16 USC aa-mm
- American Indian Religious Freedom Act, 42 USC 1886
- National Environmental Policy Act, 42 USC 4321 *et seq.*

Section 106 of the National Historic Preservation Act requires Federal agencies to consult with the State Historic Preservation Office (SHPO) regarding impacts that a proposed project may have on cultural resources. Appendix A contains the results of consultation with the Colorado SHPO regarding potential impacts from the Proposed Action. The Colorado SHPO opinion is that ADF would not impact cultural resources.

5.0 ORGANIZATIONS AND INDIVIDUALS CONTACTED

The following organizations and individuals were contacted during the development of this Environmental Assessment. If an organization was contacted only to have information sent, the individual name is left blank

<u>Organization</u>	<u>Name</u>
United States Air Force	Pilson, Daniel (SMC/CEV) Hester, Mark, Capt. (DET 3, HQ SMC/FE) Bryson, Russ (DET 3 HQ SMC?FE)
Air National Guard	Koclanes, George P. (140 FW/DCS/EM) Parker, Greg, Capt. (140 FW/DCS/EM) Mitchell, David (140 FW/DE) Barnes, Chris (140 FW/DE) Melaragno, Mike (140 FW) Johnson, Larry (140 FW) Marusin, Wayne (140 FW/DE)
U.S. Army Corps of Engineers	Krupa, Gary (CEMRO-ED-MF) Lybarger, Sharon
Brown & Root Services Corporation (Buckley)	Mullans, John
Black & Veatch	Schneider, Joseph Lenz, William R. Smith, Kenneth
The Colorado History Museum Colorado Historical Society Office of Archaeological and Historic Preservation	Sullivan, Mary Patterson, Karen
State of Colorado, Air Pollution Control Division	Dyer, Jim Myers, Dennis

Organization

Name

National Weather Service,
National Climatic Data Center

City of Aurora, Colorado,
Planning Department

U.S. Department of Commerce,
Bureau of the Census

U.S. Department of Interior,
Fish and Wildlife Service

Carlson, LeRoy W.
Garcia, Bernardo

U.S. Geological Survey
National Earthquake Information Center

Reagor, Glen

Tri County Health Department

Denver Metropolitan,
Air Pollution Control District

Public Service Company
of Colorado

Stutz, Mark

Colorado Department of Health,
Hazardous Materials and
Waste Management Division

Gonzales, L.

6.0 REFERENCES

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Lenz, W. 1992. September 25, 1992, personal communication with J. Cudworth.

Lynn (Lynn, L. S., and J. B. Brown). 1971. *Soil Survey of Arapahoe County, Colorado*. U.S. Department of Agriculture, Soil Conservation Service, Washington, D.C.

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Melaragno, M. 1992. July 30, 1992, personal communication with J. Cudworth.

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Parker, G. 1992. Handout delivered to J. Cudworth.

Powers (Powers Elevation Co., Inc.). 1990. *Cultural Resource Management Report, Historical Survey of World War II Era Buildings, Buckley Air National Guard Base, Aurora, Colorado; and cultural Resource Management Report, A Cultural Resources Inventory of the Buckley Air National Guard Base, Arapahoe County, Colorado*.

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TRW (TRW, Inc., and Woodward-Clyde Consultants). 1991. *Hazardous Waste Stream Evaluation; USAF Aerospace Data Facility; Buckley Air National Guard Base; Aurora, Colorado*.

USAF (United States Air Force). 1991. *Aerospace Data Facility Design Manual*.

7.0 LIST OF PREPARERS

UNITED STATES AIR FORCE

<u>Organization/Name</u>	<u>Professional Discipline</u>	<u>Document Responsibility</u>
Pilson, Daniel	Civil/Environmental Engineering (SMC/CEV)	Project Manager
Hester, Mark, Capt.	Facility Engineering (DET 3, HQ SMC/FE)	Technical Review

HALLIBURTON NUS ENVIRONMENTAL CORPORATION

<u>Organization/Name</u>	<u>Professional Discipline</u>	<u>Document Responsibility</u>
Evans, Daniel M.	Environmental Planning	Project Manager Description of Proposed Action Socioeconomics Cultural Resources Visual Resources
Connor, Steven J.	Physics	Noise
Cudworth, Jon A.	Environmental Permitting	Deputy Project Manage Regulatory Review Utilities Floodplains and Wetlands Waste Management
Craig, William J.	Environmental Planning	Technical Review
Crandall, Karin	Environmental Engineering	Air Resources

<u>Organization/Name</u>	<u>Professional Discipline</u>	<u>Document Responsibility</u>
DeCamp, Gregory C.	Biology	Hazardous Waste Management Technical Review
Dier, Susan P.	Project Coordinator	Document Production
Doenges, James M.	Biology	Biological Resources Technical Review
Hippensteel, David L.	Geology	Technical Review
Moore, Philip R.	Biology	Biological Resources
Publications Department	Graphic Arts, Reproduction, Word Processing, Proofreading, and Editing	Document Production
Rasor, Elizabeth A.	Geology	Geology, Soils, and Groundwater

APPENDIX A
CULTURAL RESOURCES CONSULTATION



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE AND MISSILE SYSTEMS CENTER (AFMC)
LOS ANGELES, CA

HQ SMC/CEV
P.O. Box 92960
Los Angeles AFB, CA 90009-2960

5 August 1992

Ms. Mary Sullivan
Office of Archaeological and Historic Preservation
Colorado Historical Society
The Colorado History Museum
1300 Broadway
Denver, Colorado 80203-2137

Dear Ms. Sullivan:

The purpose of this letter is to inform your office regarding the proposed expansion of the Aerospace Data Facility (ADF) at the Buckley Air National Guard Base in Aurora, Colorado. We are currently preparing an Environmental Assessment for this action in compliance with the National Environmental Policy Act and are seeking your comments, in accord with Section 106 of the National Historic Preservation Act, with respect to the possible impacts on archaeological, cultural and historic resources due to this proposed expansion.

The proposed addition would involve construction of a two-story office building (75,000 square feet per story), along with modifications of existing utilities (gas, sewer, and transmission lines), access roads, and back-up power supplies. Approximately 5 acres would be affected by the construction and modification activities, which are scheduled for the second quarter of 1993 (see attached Figures 1 through 3). The area proposed for development, which lies north of existing Building 401, is within double security fences and has been previously disturbed and is not expected to impact archaeological cultural and historic resources.

Please expedite your review for this project so that we may include the results in the Environmental Assessment. Please contact my Project Manager Mr. Dan Pilson at (310) 363-1409 if you have questions or require additional information.

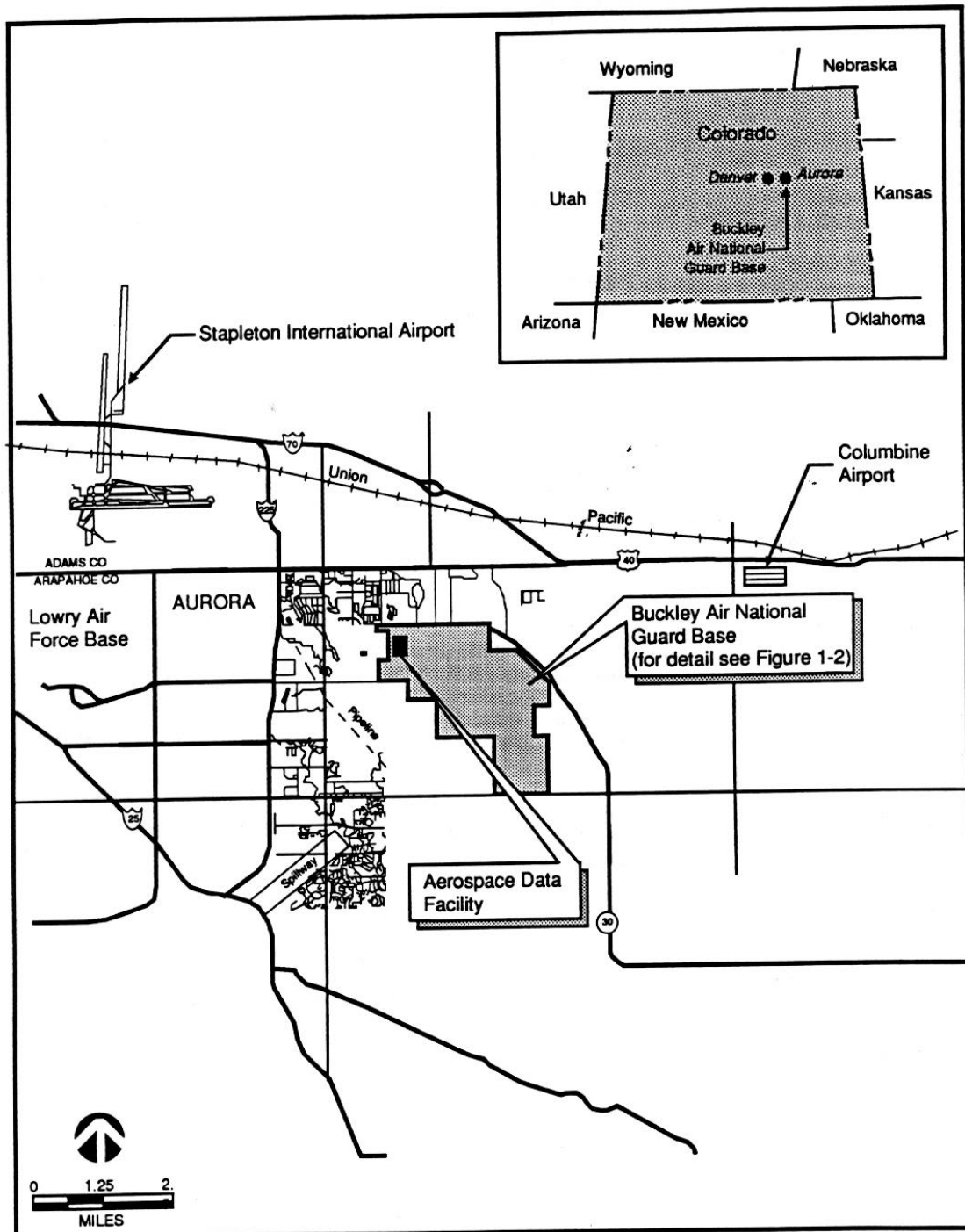
Sincerely,

A handwritten signature in black ink, reading "John R. Edwards", is positioned above the typed name.

John R. Edwards
Chief, Environmental Planning Division
Acquisition Civil Engineering

Attachments

1. Figure 1
2. Figure 2
3. Figure 3



Source: Higginbotham & Associates, 1988.

Figure 1. Location of the Aerospace Data Facility

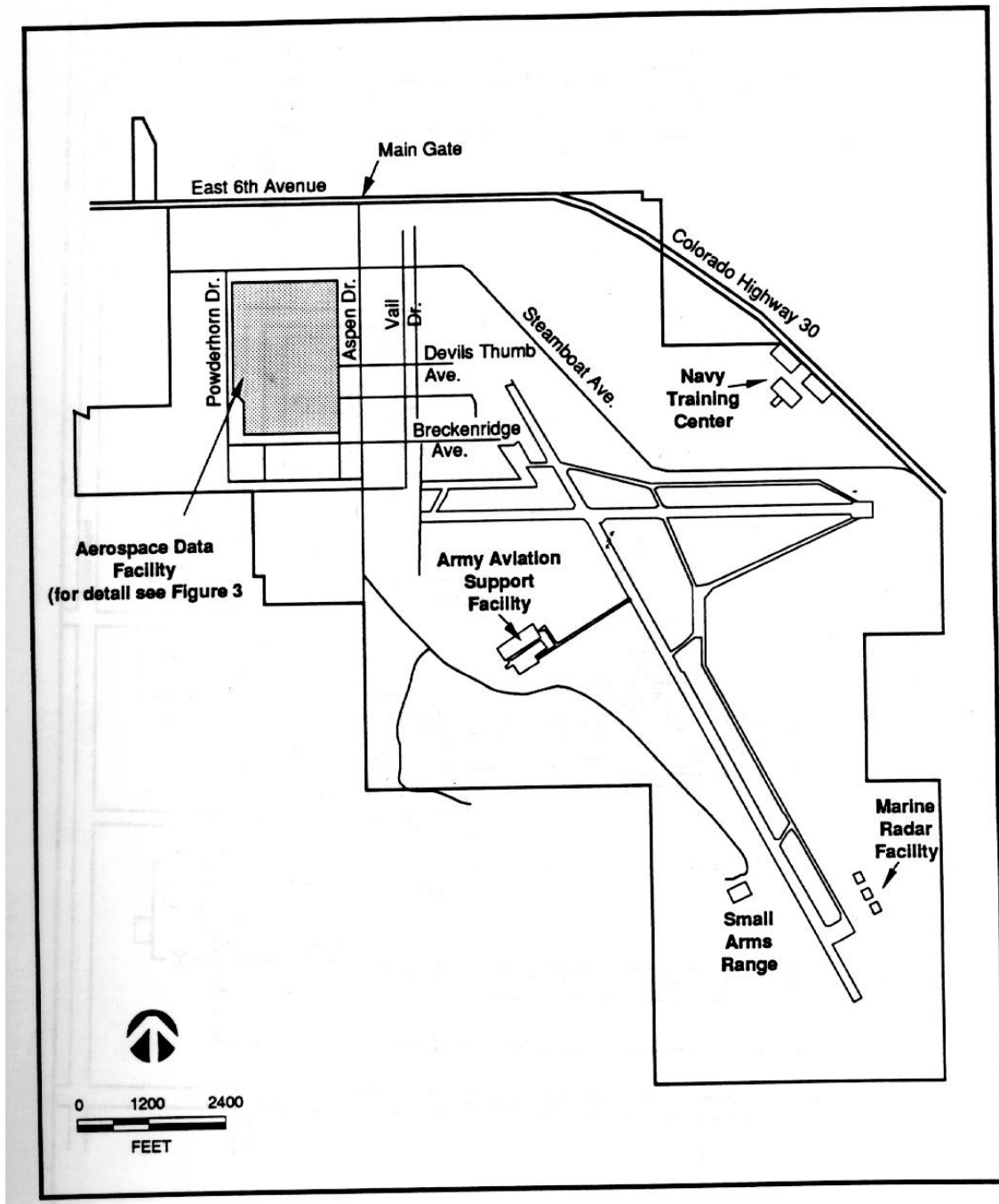


Figure 2. Main Features of Buckley Air National Guard Base

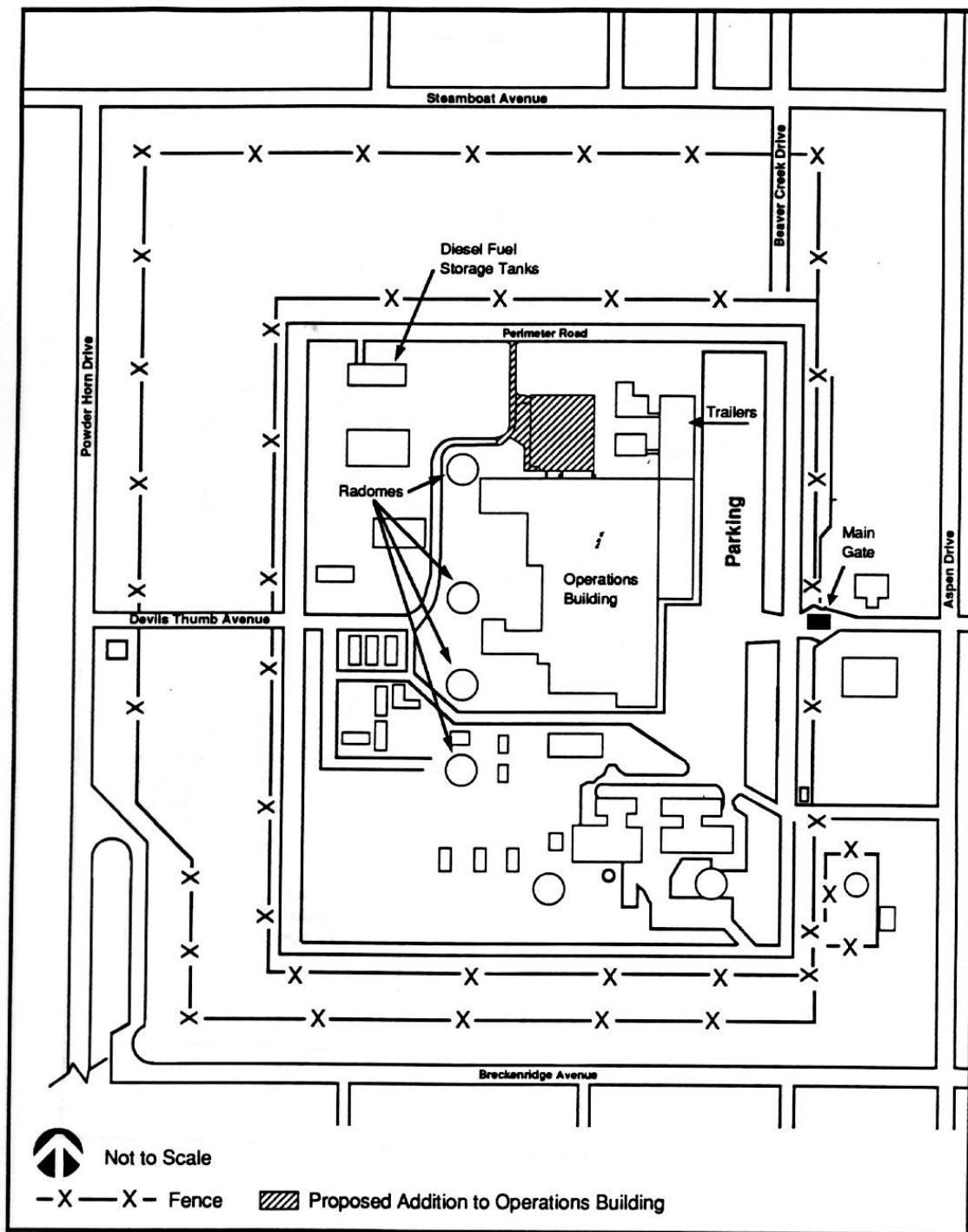


Figure 3. Aerospace Data Facility Site Plan and Proposed Addition



COLORADO
HISTORICAL
SOCIETY

The Colorado History Museum 1300 Broadway Denver, Colorado 80203-2137

September 30, 1992

John R. Edwards
Chief, Environmental Planning Division
Acquisition Civil Engineering
Department of the Air Force
HQ SMC/CEV
P.O. Box 92960
Los Angeles AFB, CA 90009-2960

Re: Aerospace Data Facility (ADF) Expansion, Buckley Air National Guard
Base, Aurora, Colorado

Dear Mr. Edwards:

Thank you for your correspondence dated August 5, 1992, concerning the above
undertaking.


It is our opinion that:

 X Since there are no historic properties located within the area of potential effects of
this undertaking, there will be no effect on historic properties.

 X If subsurface archeological resources are encountered during ground disturbing
activities, it will be necessary to halt the work until such resources can be evaluated in
consultation with our office.

If we may be of further assistance, please contact Kaaren Patterson, our Technical
Services Director, at (303) 866-3398.

Sincerely,



James E. Hartmann
State Historic Preservation Officer
JEH/KKP

cc: ✓ Dan Evans, Halliburton NUS

APPENDIX B

THREATENED AND ENDANGERED SPECIES CONSULTATION



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SPACE AND MISSILE SYSTEMS CENTER (AFMC)
LOS ANGELES, CA

HQ SMC/CEV
P.O. Box 92960
Los Angeles AFB, CA 90009-2960

5 August 1992

Mr. LeRoy W. Carlson
State Supervisor
U.S. Fish & Wildlife Service
Colorado Field Office
730 Simms Street, Suite 290
Golden, CO 80401

Dear Mr. Carlson:

The purpose of this letter is to initiate an informal Endangered Species Act Section 7 consultation for the proposed expansion of the Aerospace Data Facility (ADF) at the Buckley Air National Guard Base (ANGB) in Aurora, Colorado. We are currently preparing an Environmental Assessment for this action in compliance with the National Environmental Policy Act and are seeking your guidance with respect to the possible presence of threatened or endangered species that may be affected by the proposed action.

The proposed addition would involve construction of a two-story office building (75,000 square feet per story), along with modifications of existing utilities (gas, sewer, and transmission lines access roads, and back-up power supplies (two 2,500-kilowatt emergency diesel generators would be added to the present complement of six). Approximately 5 acres would be affected by the construction and modification activities, which are scheduled for the second quarter of 1993 (see attached figures 1 through 3).

The area proposed for development, which lies north of existing Building 401, is within double security fences and is either paved or sparsely vegetated. The area provides only marginal wildlife habitat, but may be used by some small mammals, songbirds, and migrating raptors. We are not aware of any rare or unusual animal species that use the area, nor are we aware of any unusual plants in the vicinity.

Please expedite your review for this project so that we can include the results in the Environmental Assessment. Please contact my Project Manager Mr. Dan Pilson at (310) 363-1409 if you have questions or require additional information.

Sincerely,

A handwritten signature in dark ink, appearing to read "John R. Edwards", is written over a horizontal line.

John R. Edwards
Chief, Environmental Planning Division
Acquisition Civil Engineering

Attachments

1. Figure 1
2. Figure 2
3. Figure 3

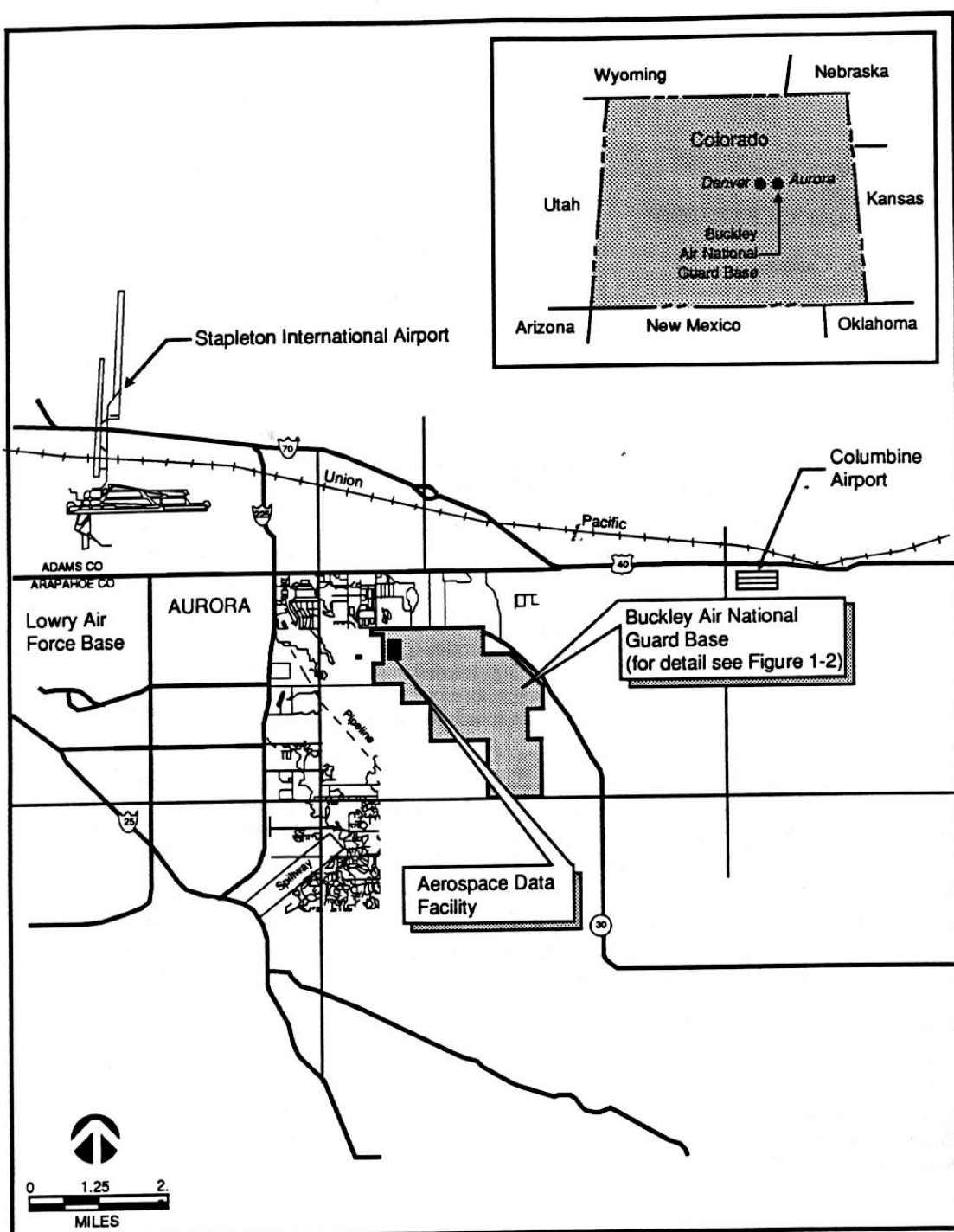


Figure 1. Location of the Aerospace Data Facility

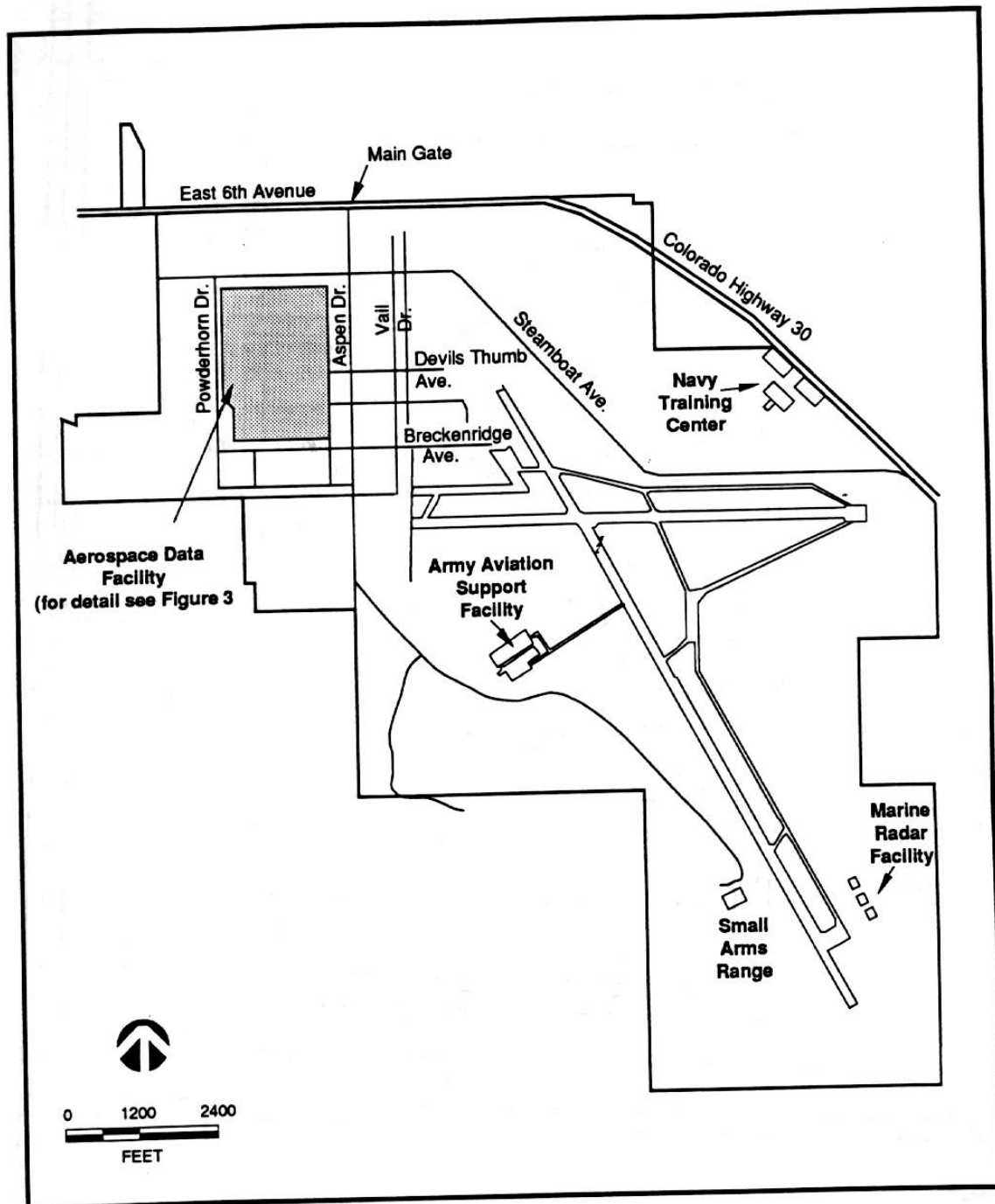


Figure 2. Main Features of Buckley Air National Guard Base

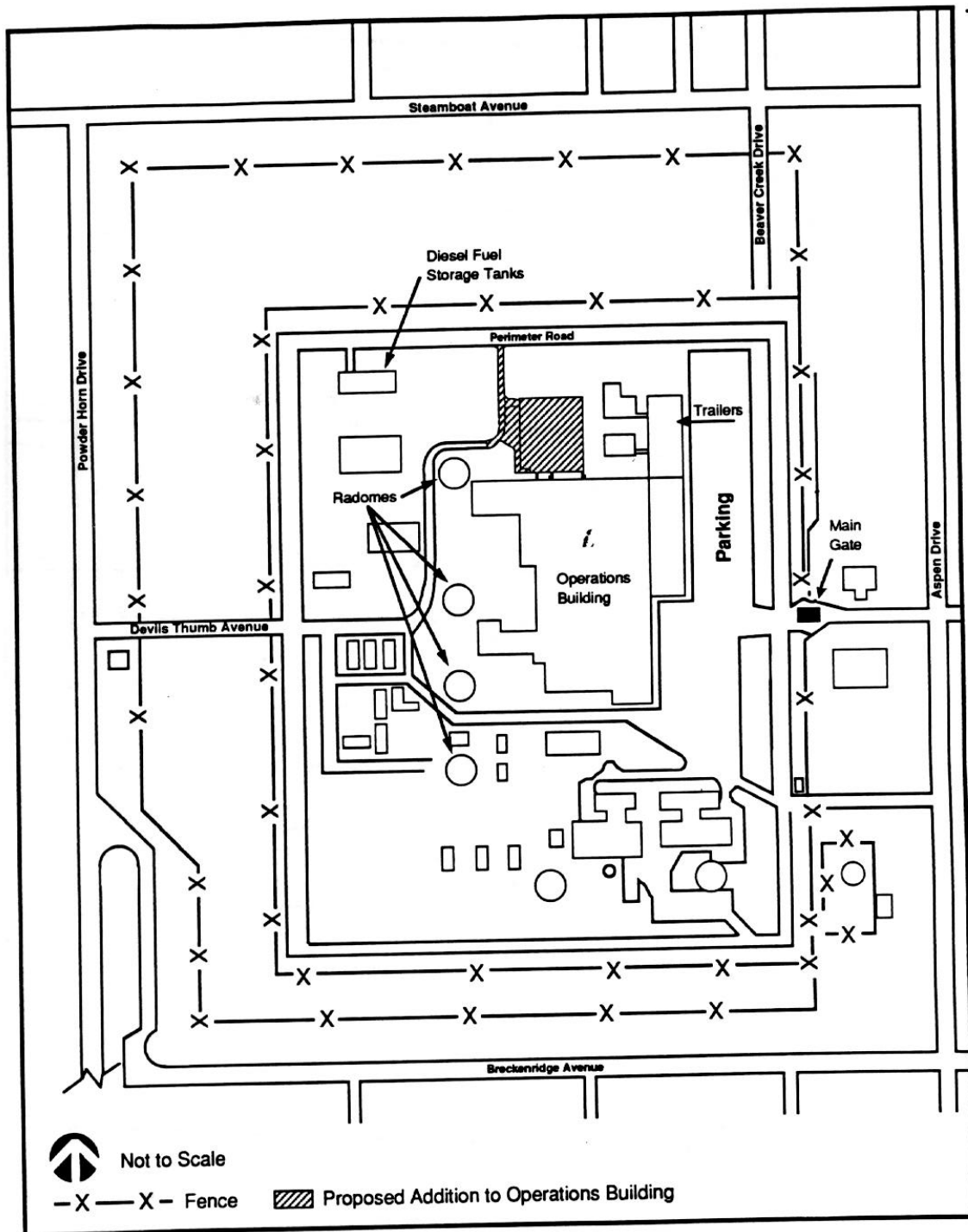


Figure 3. Aerospace Data Facility Site Plan and Proposed Addition



United States Department of the Interior



FISH AND WILDLIFE SERVICE FISH AND WILDLIFE ENHANCEMENT

Colorado State Office
730 Simms Street, Suite 290
Golden, CO 80401

Phone (303) 231-5280 FTS 554-5280
FAX (303) 231-5285

FWE/CO:DOD-USAF

ADF.ltr

SEP 21 1992

Mr. John R. Edwards
Chief, Environmental Planning Division
Acquisition Civil Engineering
Department of the Air Force
HQ SMC/CEV
P.O. Box 92960
Los Angeles AFB, CA 90009-2960

Re: Threatened and Endangered Species Review – Aerospace Data Facility

Dear Mr. Edwards:

The Fish and Wildlife Service has reviewed the materials provided in your August 5, 1992 letter. The Service finds that no federally listed threatened or endangered species are likely in the proposed construction area. If we can be of further assistance, please contact Bill Noonan of this office at 303-231-5280.

Sincerely,

LeRoy W. Carlson
Colorado State Supervisor

cc: CDOW, Denver (Attn: Dave Weber)
File
Reading File

APPENDIX C
ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

<u>Acronym</u>	<u>Meaning</u>
ADF	Aerospace Data Facility
AFR	Air Force Regulation
ANGB	Air National Guard Base
APEN	Air Pollution Emissions Notice
BMP	Best Management Practice
Btu	British Thermal Unit
CAA	Clean Air Act
CCR	Code of Colorado Regulations
CDH	Colorado Department of Health
CFC-11	Chloroflouorocarbon-11
CFR	(United States) Code of Federal Regulations
CO	Carbon Monoxide
COE	U.S. Army Corps of Engineers
COANG	Colorado Air National Guard
CRAC	Computer Room Air Conditioning
CWA	Clean Water Act
dBA	A-weighted decibel
DOD	U.S. Department of Defense
EA	Environmental Assessment
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPDG	Emergency Power Diesel Generator
FWS	U.S. Fish and Wildlife Service
HCFC-123	Hydroflourcarbon-123
Hr	Hour
HVAC	Heating, Ventilating, and Air Conditioning
kV	Kilovolt
kW	Kilowatt
µg/m ³	Micrograms per cubic meter
mg/m ³	Milligrams per cubic meter
MDIAQCR	Metropolitan Denver Intrastate Air Quality Control Region
MW	Megawatt
NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Policy Act
NGB	U.S. National Guard Bureau
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
NOAA	U.S. National Oceanic and Atmospheric Administration
O ₃	Ozone
Pb	Lead
pH	Relative Acidity
PM ₁₀	Particulate Matter with Diameter 10 Microns or Less
ppm	Parts per million
PSCo	Public Service Company of Colorado
RBL	Renohill-Buick-Little (a soil classification)
RCRA	Resource Conservation and Recovery Act
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Office
SO ₂	Sulfur Dioxide

SPCC	Spill Prevention Control and Countermeasure
TPY	Tons Per Year
TSP	Total Suspended Particulates
UPS	Uninterruptible Power Source
USAF	United States Air Force
USC	United States Code
UST	Underground Storage Tank
VOC	Volatile Organic Compound